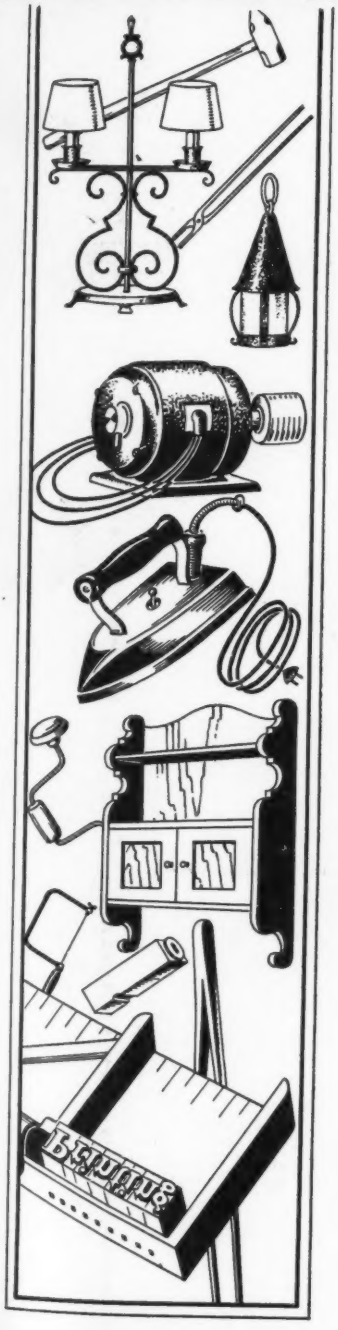
MARCH 1934

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION



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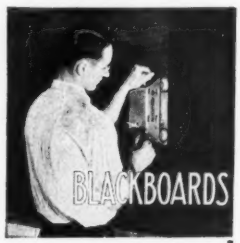

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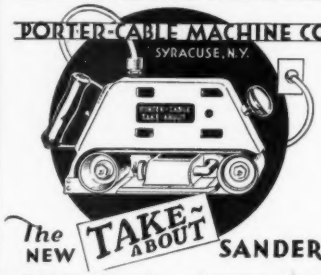

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INDUSTRIAL ARTS and VOCATIONAL EDUCATION
March, 1934
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The Value of School Exhibits

A. G. Pelikan

Director of Art Education, Milwaukee Public Schools, and Director of Milwaukee Art Institute, Milwaukee, Wisconsin

The publicity value of well-arranged school exhibits is very great. The author shows how the exhibit should be arranged to more easily sell art, household arts, and the industrial arts to the public.

IN ADDITION to the satisfaction which all students experience who produce something creatively with their own hands, there comes the thrill of having this work exhibited with the work of other students.

Even in the grades the value of exhibiting the work of the class cannot be overestimated, as it provides the pupils with a good stimulus for critical judgment of each other's work and also because it places a certain value on the finished product.

Skill in academic subjects is recognized and rewarded by a system of marks which enable the parents of students to evaluate the progress made in these subjects. In the case of art, industrial arts, and household arts, the actual progress and skill can be determined by the product which the student has produced.

There are some who do not believe in exhibiting good examples of students' work, because they fear that the exhibition may become the end itself rather than a means to an end; while others believe that it tends to develop vanity and foster conceit. My own experience in organizing many students' exhibits of various kinds leads me to believe that a well-planned, well-arranged exhibition of student work is an educational activity, which may have far-reaching beneficial results.

Fig. 1.
A promiscuous array, from which an acceptable exhibit can be arranged only with difficulty

In these days when so-called special subjects are being eliminated, often because there is a lack of proper

Fig. 2.
An excellent exhibit, made possible only by preliminary planning

understanding of their functions, a timely and well-organized exhibit may be the means to call public attention to the great amount of talent possessed by our students throughout the country, and to point out the tremendous loss which would occur if opportunities for discovering and developing this talent were not given. Such an exhibit may even serve as a means of acquainting parents with abilities which they did not suspect their own children to possess.

The illustrations which accompany this article show the evolution of and improvement in planning school exhibits.

Figure 1 shows the manner in which the material was presented for a city high-school art exhibition, shown at the Milwaukee Art Institute about five years ago. Since no definite plan had been worked out, the selection had to be made from about ten times as much material as could be shown. The work submitted by the various schools varied in size, quantity, and quality.

In order not to disappoint too many who had labored hard to make this first exhibition possible, many more pieces than good taste demanded were hung. One of the important discoveries which resulted from this first exhibition, was the fact that insufficient attention had been given to the labeling of the material. People were confused because, while the student's name, grade, and age were given, nothing was said about how long he pursued the course of which the exhibited article was an outcome. Neither did they know the purpose and objectives of the work offered by the various departments. All of this information is necessary, however, if the onlooker is to get a real picture of what is being done in the school and why it is being done.

Figure 2 shows the second exhibition. One is impressed immediately by the contrast. Narrow black

Fig. 3.
A small space well utilized. Selection rather than complexity is the keynote

Fig. 4.
Space too small for the articles exhibited

frames have been made for the 22 by 28-in. standard mounts; the material on each mount is less crowded, and larger pieces have been introduced to break the monotony. In addition, the wall space has been broken up by simple beaver-board exhibition cases for craftwork; these can be made in any manual-training shop.

Figure 3 shows what can be accomplished with a small space. In this case several booths were offered to the school board for an educational display in connection with the Annual Better Home Show held at the auditorium. Since this exhibition attracts from 90,000 to 100,000 visitors each year, it was decided that this would be a splendid opportunity to bring the work of the household arts, industrial arts, and art departments of the public schools before the public. Each department head was therefore furnished with the dimension of the space allotted to his particular work so that he could proceed to plan the exhibit which his department was to make. The art department designed the shelves for the booths, and the industrial-arts department made them.

Figure 4 shows what frequently happens when the exhibit space is too small. It always is difficult to arrange a suitable exhibit of objects of three dimensions. However, the same general rule should apply in such cases also, namely, that fewer pieces well chosen serve better for display purposes than many pieces, which, although they may represent the various types of work carried on in any school or department, compete with each other for attention. For the same reason that a

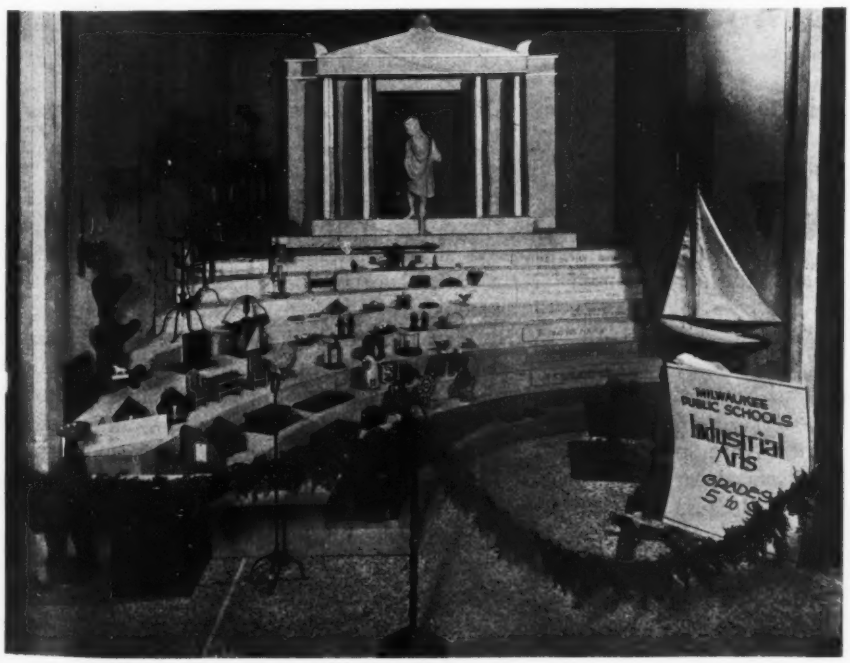


Fig. 5.
Objects chosen with small exhibiting space in mind

Fig. 6.
A household-arts exhibit

baby buggy, an ice box, and a radio do not make a good display in a merchant's window, so fine furniture, metal-working machinery, and examples from the pattern-shop do not make as good combination, regardless of how admirable each individual piece may be.

For the educational exhibits at the Better Home Show just described, teachers and students coöperated by bringing their work to the auditorium and installing it. The comments which were overheard most frequently about these school exhibits, demonstrated that many people had no idea that such beautiful and practical work was being done in the public schools. The exhibition helped to show parents and taxpayers that the schools are teaching many worth-while subjects, besides reading, writing, and arithmetic, and that such subjects as art, industrial arts, and household arts are offered in the interest of all of the students.

Occasional well-planned and attractively displayed school exhibitions, whether large or small, should be planned as a stimulus to the students and as a means of presenting the work of the various departments to the public. Experience shows that it pays.

Interpreting the Industrial Arts

Frederick James Moffitt

Superintendent of Schools, Hamburg, New York

How the industrial-arts teacher can help to sell his subject to the public is very ably told by a sympathetic school superintendent.

THE gauntlet has been thrown to the teacher of industrial arts. There is a challenge in the air. In thousands of communities suffering from severe financial strictures the cry has arisen to cut down educational expenditures. The schools, unversed in political expediencies and stratagems, have had to accept the full force of an economic depression. The accusation of "frills and fads" in education has been taken up by minority groups of taxpayers' associations and economic councils. Education is facing a continued curtailment that seems to many neither wise nor necessary.

Reduced budgets have fallen with particularly heavy force on the industrial-arts departments in many of the schools of the nation. Because education in a democracy must always lag behind the ideals of its leaders, the teaching of industrial arts is a "new" thing to many communities — one of the "fads." Why? It is inextricably bound up with the "new" concept of "learning by doing." The man on the street will not subscribe to "any new concept" until it is made clear to him in simple, understandable language. It would seem that school authorities have not yet adequately interpreted the schools to the public.

By virtue of his work and the philosophy that he must daily exemplify, the instructor in industrial arts is a leader in the newer forces and concepts of education. He cannot escape the responsibilities of that leadership. If the schools have not been interpreted adequately, then he must help with that interpretation. He must not only "sell" the industrial-arts program to the community in which he works; he must, through that program, help to "sell" the whole new school philosophy.

This is no startling conception. In hundreds of cities and villages in this country, particularly in the smaller

A well-arranged exhibit at the County Fair, even when under the handicap of unattractive surroundings, serves as a powerful medium to portray to the public the significant values of the industrial-arts program. Photograph Hamburg Junior-Senior High School, Hamburg, New York

school units, the teacher of industrial arts has often been the best interpreter that the school has had. In many instances he has been the only one. Sound educational administration teaches us that the superintendent of schools, working with the board of education, should assume the duty of interpreting the school to the man on the street. Busy with a tremendously increasing school population and with new school plants, the school executive has, too often, been forced to neglect this phase of his work. In many cases, much of the burden of interpretation has been thrown on the industrial-arts department.

Is there a school exhibit to be opened to the public? Let the industrial-arts department prepare its finest work and arrange the plan of exhibition. Are the managers of the county fair complaining because the school has not sent its products to the educational bazaar? Let the boys in woodworking hurry their handicraft to the fairgrounds at once. Are the school trophy cases in need of a new motif? Arrange a printing exhibit to take the place of the tarnished silver cups.

This is right and proper. The industrial-arts department has welcomed its unsought rôle in school affairs and has eagerly assented to such suggestions for interpreting the schools. But with the glory that has accrued to the department have come certain dangers.

It may be because of some of this prominence given to the industrial-arts program in presenting the school, that the program itself has been misinterpreted. It has been looked at as a new bump on the already swollen curriculum of the school, rather than an articulate part of the whole educational program. It has been viewed with alarm by the proponents of an older concept, who represent real "culture" and think in terms of the selective curriculum of a decade ago. Too often the work of the industrial-arts department has not been realized as a vital part of the whole school purpose to serve every level of a changing school population. It has not been truly presented as a harmonious part of the new concept of public education for a democracy.

Because of the rapid growth and the "newness" of the industrial-arts program, a clamor for retrenchment has thus singled out that program for curtailment or elimination from the school curriculum.

If this is true, it behooves the instructor in industrial arts to reorient himself in his relationship to the program of the school as a whole. In the face of unexpected demands for curtailment, he must reëxamine his position as interpreter of the school. He must restudy the entire public-school-relations program to see where he may best fit in and he must reëvaluate every method for interpreting the schools to the public.

This does not mean for one moment that the instructor must limit his activities in interpretation. It does not imply that such interpretation is lacking in sound values or that it has been overstressed. What it does mean, is that the time has come for careful study by the leader in industrial arts in methods of "selling" the new philosophy of the entire school through the medium with which he is best acquainted. How shall he go about this business? Before he can successfully use any method of interpreting the schools, the industrial-arts leader must understand thoroughly the philosophy and objectives of modern education. He must formulate his own school philosophy in definite terms that are meaningful to the man on the street. He must recognize himself as a part of the whole school system, as important in the teaching of "culture" as the instructor of Latin or French, as useful in the teaching of art as the instructor in music or drawing, as inspirational in the teaching of better citizenship as the instructor of civics or history. The teaching of industrial arts must be articulated with the entire program of the schools just as carefully as the teaching of English.

Authorities in the field of public-school relations stress that one of the great avenues of approach to the

More interested parents and enlightened school patrons will result from visits to a school shop where comprehensive general-shop program exemplifies living industrial experiences. Photograph taken at the Hamburg Junior-Senior High School, Hamburg, New York

public lies in the child who is benefiting by the school. In dealing with the children and the home, the industrial-arts teacher has an advantage over the average envoy from the school. He is supposed to be practical and efficient and with no silly notions of abstract scholarship. Who, then, can better interpret to the home the program which the modern school has embarked upon? Who can better convey the objectives of the school program? Yet this information cannot be given unless the industrial-arts instructor thinks of himself as an integral worker in the whole educational process.

This is true, too, in the matter of exhibits and all publicity emanating from the industrial-arts department. That the exhibits should be sound in themselves goes without saying. But, more than this, every exhibit should stress the underlying objectives which are expected from the work at school. A bookstand in the trophy case is to the average school visitor a bookstand, no more and no less. Furthermore, the particular bookstand which he views at the school exhibit is probably a poor specimen of a bookstand as measured by the work of expert craftsmen he may know. Unless there is explanation offered as to the values sought in the making of this particular piece of work or unless information is given about the educational processes called upon in its construction, the exhibit is not meaningful from the school standpoint. If the instructor would make his exhibit worth while as an avenue of interpretation, there must be less public emphasis on the actual handicraft and more on the lasting educational values obtained from the work. The teacher of industrial arts is not working with wood and metal and pieces of type but rather with the dreams and aspirations of boys and girls. Can the advocate of cut-throat budgets but visualize this greater concept, he will become the enthusiastic supporter of the whole program of the free public schools of America..

The exhibits which can be set up by the instructor of the department in industrial arts compose one of the finest methods of teaching the public an appreciation of the school. But they often suggest another method of interpretation which is dangerous in the extreme. Probably no single teacher in the industrial-arts field has escaped the school patron who, on viewing the work in industrial arts, conceives the idea of using the department for his own ends. Probably every superintendent in his desire to please the public, has at one time or another, thought of the industrial-arts department in terms of a production unit rather than its worth in facilitating the instructional processes of the school.

Leaders in the industrial-arts field have stressed repeatedly and in unmistakable tones the dangers that accompany such a course. Yet, pressure from outside organizations and a desire to be of service to the community often lead the industrial-arts interpreter astray.

Thus speak members of the school board, well meaning and ambitious to assist in further popularizing the industrial-arts work, to the superintendent:

Why can't the boys in industrial arts shingle the home-making cottage? Why not set up a small repair shop for electrical appliances, such as flatirons and vacuum cleaners? The department can prove its practical nature and at the same time save money for the school.

Thus speak members of benevolent societies and good-will workers in the community, to the teacher in the printshop:

How about a couple of hundred tickets printed for our charity dance? Why can't you run off a simple program for the little play we are presenting?

The answer to all these demands is, of course, an emphatic "No," and yet many a friend of the school is aggrieved at such seeming lack of coöperation.

Board members, superintendents of schools, and well-meaning patrons must be patiently shown that

the industrial-arts department cannot pay dividends in these friendly ways. Dividends cannot come from exploiting the boys and girls as apprentices for inefficient production jobs. They come with the teaching for guidance and inspiration and the gaining in the knowledge of the underlying principles which will point to richer living and greater happiness.

So the instructor in industrial arts must examine carefully the dangers as well as the advantages of the attempts made to interpret the school through his department.

The field of public-school relations is expanding so rapidly that it is increasingly difficult to keep abreast of the various projects and devices which must be used to present the school. Formerly, the interpreter of the school felt that if he could gain a tiny portion of the public's time to offer information on the work of the school he was extremely lucky. It was estimated that 4 per cent of the total hours of the day might be used by the average man to keep informed of the world in which he lived; a world of work and wages and transportation and utilities and health and sport and politics and the thousand and one interesting things which clamored for his attention.

Today, that limit of time has been increased. Because of economic and sociological changes through which the nation is struggling, more adult time has been set free for study and thought. Man is examining, as never before, the implications of the institutions he has set up for his own advancement. The church, the school, and the home are being criticized and evaluated as never before. There is an interested searching of programs and objectives. The general public admits its ignorance of the program of the public school but, in the main, it is entirely friendly and anxious to learn.

Daily, before the eyes of educational leaders opens a new vista for informing the public about the schools. The instructor in industrial arts can help valiantly in the enlightenment of that public. He believes that he has already incorporated in his own work, many of the progressive practices that forward-looking educators are advocating for the whole school program. He knows that many of the methods and devices for interpreting the school are at his hand. To meet the needs of an emergency in education, every teacher in the school must become, in some degree, an interpreter to the public. The instructor in industrial arts is particularly fitted to lead the way.

Wood Carving—III

J. I. Sowers

Director of Industrial Arts, Miami, Florida

This is the third article in a series describing the art of wood carving for industrial-arts students.

IN THIS article on wood carving, the subject of *pierced work* will be described. In a short discussion of a subject so extensive as wood carving, much has to be left out that would be given in a fuller treatment of the work. These brief descriptions, however, will give the student a good working knowledge of wood carving upon which a more extensive ability of the subject may be built by further study and practice. Carving is, of course, an art subject, and like all art subjects ability of accomplishment lies more in close observation and practice than in any amount of book instruction.

Pierced work is not unlike jig-saw or fret work in one respect; that is, the background of the design is entirely cut out. This has the effect of throwing the design to be carved into bold, free relief. The examples shown in Figure 10 will give a clear idea of this type of work. Pierced work is not a difficult form of carving. There is no long, tedious cutting away of the background, nor is there any outlining of the design to be carved. The entire background is cut away with a jig or saber saw, or if power tools are not available, with a coping or turning saw. The one requirement of this type of carving is neat and well-designed models, because, as one can look right through the work, all shapes and forms stand out in such relief that slight imperfections in design become very apparent. Beyond demanding a neat, well-turned design, this form of carving is quite easy. Sometimes pierced work is combined with other forms of carving. Some of the designs on Figure 10 are of this character, in which case this type of carving merely makes its contribution to the general effect of the whole. Chippendale used this form of carving perhaps more extensively than any of the old masters in furniture design; but it also was used by Heppelwhite, Sheraton, and Phyfe. The doorway shown in Figure 11 is a splendid example of this type of work. This doorway[1] is from a home in Coral Gables, Florida. It is carved the same on both sides, and is one of the best examples of this kind of carving that has ever come to the attention of the writer. Aside from the sawing, this is all handwork.

In undertaking pierced work for the first time, a simple design should be selected. Draw all parts to be pared down or cut away with a pencil. A very little practice with this kind of carving will quickly develop excellent command of the tools used, and with the advance of skill more difficult work may be undertaken. It often has been a surprise how rapidly boys in the manual-arts classes learn how to do this type of work.

[1]Designed and made by the Imperial Wood Carving Studio, Miami, Florida.

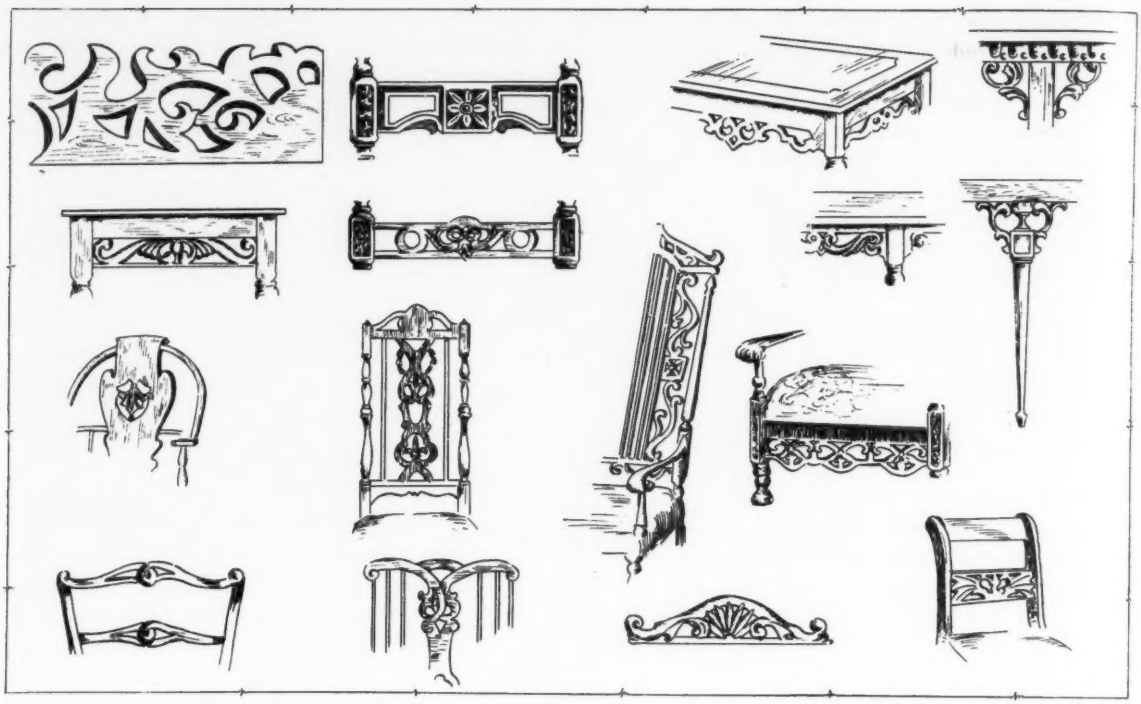


Fig. 10. Types of designs used in pierced work carving

After the cutting is done, a little rasping and sanding finishes the work.

Figure 12 shows a sketch, a mechanical drawing, and the necessary details for making a Tudor-style coffee table. In this model some very simple pierced carving is used. The rails are carved in chased-work designs, which has been previously described. This table is not only excellent in design but not too difficult for students in the advanced secondary grades. The amateur who has taken up art cabinet work as a hobby will find in this project a very pleasing test of his skill. The rails of the table are cut down as indicated in the drawing to give the appearance of wear and age. If the top is tiled, as shown in the sketch, it should be framed together, and not made solid and then cut out. The table will look very well, however, without having a tiled top.

Fig. 11. A doorway representing a fine example of pierced work carving

In beginning carving the novice is likely to get too ambitious and attempt work beyond his ability. This project is given here to offer something that the amateur in this work may test his skill upon. At the same time, he may confidently expect to accomplish what is required for this job, if he has a fair knowledge of woodworking, and has followed these lessons in wood carving up to this point.

The lamp base shown in Figure 13 is introduced into this article to offer an advanced review project in the type of work previously studied. This project is a combination of incised work, chasing, and a bit of relief carving. For the beginner, some fairly easy-cutting wood, worthy of the work to be put upon it, such as walnut, Honduras mahogany, or chestnut, should be chosen.

The dimensions, shown in Figure 14, are complete enough to leave little to be explained in the text material. The piece is first turned, care being taken that it is left large enough for cutting the small relief work shown at the top of the project. It will be noted that

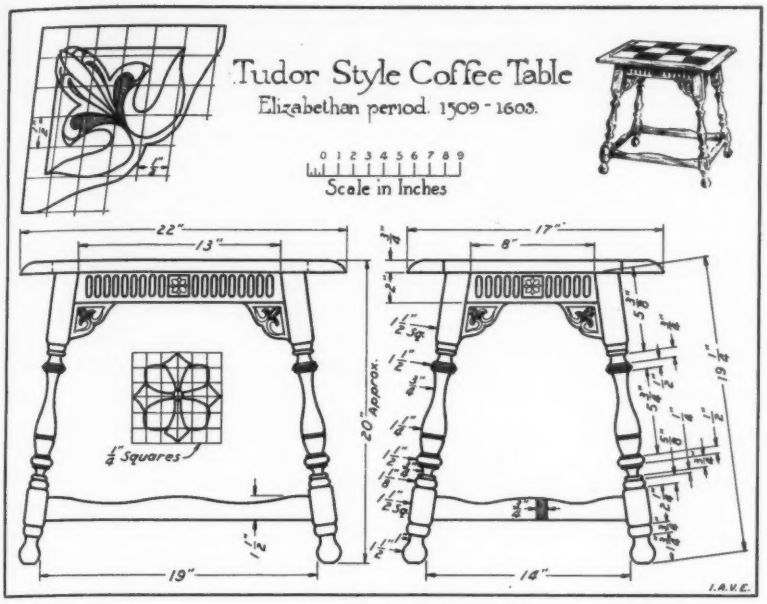


Fig. 12. Tudor coffee table

the reed work on the body of the lamp base is not cut in relief but is cut into the wood — this type of reed work being much easier to do. The piece may, of course, be returned to the lathe for any final finishing and polishing that may be necessary. The laying off of the reeding is best done if a strip of paper the length of the largest circumference is laid off in the proper divisions, then wrapped around the base and the divisions transferred to the wood. The vertical lines can then he laid off from these points after the base is centered in the form box jig, as shown in the illustration. The sides of the box afford guides for a gauge. This gauge may be made for the occasion as shown. The size and kind of carving tools to be used are indicated. This type of work requires great care, and the worker must accustom himself to working over a curved surface. Work of this kind demands mechanical ability, but makes less demand upon the art ability of the student than do some of the more advanced forms of carving.

Just at this point it seems that we cannot hope to progress much further without saying something more about tools. The worker who expects to do much carving will gradually acquire a first-class kit of tools adapted to the kind and nature of the work he is doing or expects to do. As previously said, the amateur will do best to buy his tools a few at a time just as he needs them. There is really no such thing as a "set" of carving tools. As new work and more advanced complicated designs are undertaken, new shapes of tools will be required. Some carvers who have access to metal-working equipment make their own tools. It is possible, also, to adapt your carving designs to the tools you have and in this way lessen the need for an extended list of special tools.

The twelve tools shown in Figure 15 offer a fair

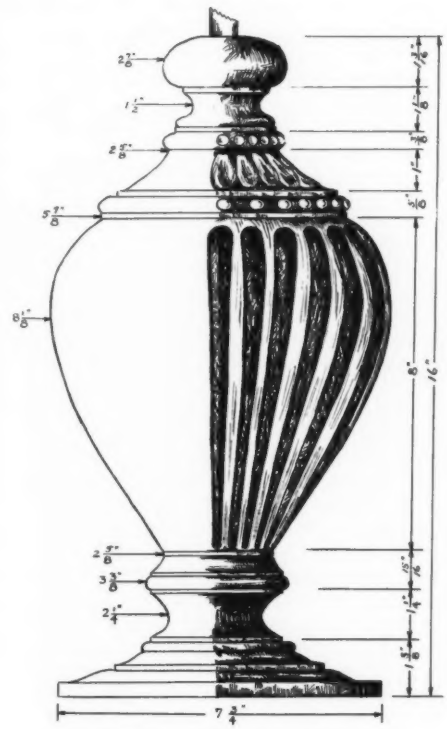


Fig. 13. A carved lamp base

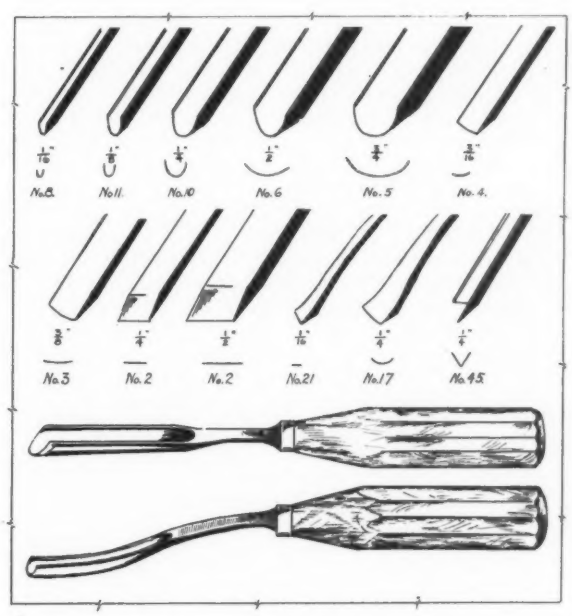


Fig. 15. Some sizes and shapes of carving tools most used by the beginner

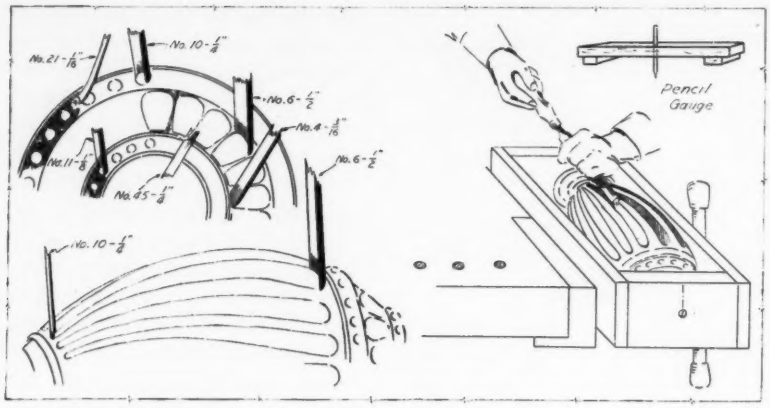


Fig. 14. Details for making lamp base

selection for the amateur. With these, much work in all different types of carving may be done. The beginner will do well to purchase his carving tools ground ready for use. He will then learn the correct bevel required for most ordinary work. It will be noted that carving chisels are ground with the bevel on both sides, instead of only on one side. The gouge is the most used tool in the carver's kit. For this reason he must have a far larger selection of gouges than of any other kind of tools. The gouges come with various degrees of curve in the cutting edge. This is called the "sweep." Chisels are either straight across the end, or skew; this latter is ground off diagonally. Practically all types of carving tools, except the chisels, come with different shaped shanks — straight, curved, quick-bent, and back-bent. All of these shapes as well as some special tools not mentioned here, are shown in any good carving-tool catalog. Tools set in octagon-shaped handles offer a better means of control than those set in round handles.

It may be taken for granted that those who read this article are fairly familiar with the proper sharpening of fine-edge tools. This will make it necessary to elaborate on the sharpening of carving tools. It may be necessary to remind the amateur at this work that tools used in carving must be kept practically razor sharp. For this reason it will be necessary to purchase fine-grained slip stones to fit the inside curves of the tools. A leather strop, tacked to a wood base, on which a little fine emery paste is used, will be useful in finishing the cutting edge.

Mechanical Drawing in Illinois

R. F. Van Deventer

Evanston Township High School,
Evanston, Illinois

A summary of a study made of mechanical-drawing courses in Illinois high schools which forms the basis of the master's thesis by the author. This thesis is on file in the library of the School of Education, Northwestern University, 1933.

THE purpose of this article is to present a summary of the results of a survey of practice in the teaching of mechanical drawing in Illinois high schools.[1] The high schools located within the city of Chicago are not included. The data for this study were collected during the spring of 1932, and were furnished by teachers in 142 high schools located in all sections of the state. Of the 142 schools, 124 reported an organization based on the typical four-year plan, which includes grades nine, ten, eleven, and twelve.

Objectives

Teachers were asked to state what they considered to be the main aims or objectives of the courses which they were teaching. The many different statements of objectives received, totaling 382, could be tabulated only by grouping similar statements together and listing them under a common heading. Nearly all statements seemed to fit with reasonable accuracy under one of seven headings, as follows:

	No. of Answers
1. General education	84
2. Skill in the manipulative processes	83
3. Reading and executing working drawings	68
4. Principles of drawing	61
5. Vocational preparation	38
6. Guidance	29
7. Aid to other subjects	19
Total	382

A further classification of these objectives was made by grouping them under two main headings which were designated as *general education* and *vocational preparation*. The replies of teachers consistently recognized these two broad objectives. If all the replies are arranged under the two main headings as suggested, it would seem that Nos. 1, 4, 6, and 7 would fall together as contributing more largely to the objective of general education, while Nos. 2, 3, and 5 would fall together as contributing more largely to vocational preparation. On this basis the total number of replies under each heading is approximately equal, being 193 and 189, respectively, indicating that the mechanical-drawing teachers coöperating in this study consider the broad general values of the subject equivalent to the specific vocational values.

Organization of Courses

In tabulating the courses, it was evident that there was a rather definite grouping, which may be described as follows: Group I, typical first-year courses; Group II, typical second-year courses; Group III, architectural drawing; Group IV, advanced architectural drawing; Group V, machine drawing; Group VI, advanced machine drawing; Group VII, miscellaneous. It is clear that Groups I and II cover the usual topics of elementary courses. A large number of course titles were

[1]The writer wishes to acknowledge the helpful assistance given by Prof. Henry J. Otto, School of Education, Northwestern University, during the progress of the study.

used to name courses listed under each grouping, indicating a considerable lack of uniformity in designating similar courses in different schools.

The grade level for which each group of courses is designed shows a spread which covers two, three, or even four grades. This is shown in Table I. The table seems to point to the fact that courses are designed primarily for a given grade level but at the same time are also open to students from other grades. This in itself presents the problem of proper adjustment to individual abilities.

TABLE I

Grade Level for Which Each Group of Courses is Available

Group		No. of Courses Classified in Group	Grade			
No.	Course		9	10	11	12
I	First Year	127	99	47	14	12
II	Second Year	61	10	47	22	17
III	Architectural	42	3	15	30	19
IV	Adv. Architectural	14		1	9	11
V	Machine	40		15	22	15
VI	Adv. Machine	13		3	7	10
VII	Miscellaneous	17	5	8	12	7

Slightly more than one half the courses in Groups I and II are given as separate courses. The other courses in these groups are given in a combined form with shop courses. The architectural- and machine-drawing courses are given almost wholly as separate courses. When the drawing and shop are combined, the proportion of time given to each is predominately one half and one half, of two fifths and three fifths.

In 75 per cent of the cases, each individual instructor has full responsibility for the outline of his own course of study. In 15 per cent of the cases, the outline of the courses is the result of coöperation with other members of the department. In the remaining 10 per cent of the cases, courses are outlined, either wholly or in part, by the administrative officers.

The average enrollment in mechanical-drawing classes as reported by 112 high schools is approximately 13 per cent of the total enrollment of the schools. The percentage of pupils enrolled in mechanical-drawing classes in the large high schools tends to be noticeably less than in the smaller high schools.

The trend of enrollment is indicated by answers to the question, "As compared with the total enrollment in your school during the last three years, has the enrollment in mechanical-drawing classes tended to increase? —— decrease? —— remain the same? ——" The answers from 134 schools are as follows: increase, 77; decrease, 4; remain the same, 53. During this same period a total of 52 courses were added by all the schools, while only 8 courses were dropped.

In answer to the question, "Is a definite effort made to correlate any of the drawing problems with projects executed in the shop?" the affirmative replies of teachers for the courses in Groups I, II, and VII exceeded the negative replies in the ratio of approximately two and one half to one. For the courses in the other groups, this ratio was just reversed. It seems that correlation between drawing and the shop consists in having "students prepare drawings of projects which are to be made in one shop." This answer in practically identical form was given 85 times out of 113 answers. The efforts to correlate the drawing and shop courses are confined largely to the beginning courses, obviously because the courses are offered together in a combined form with the shop. Practically no attempt whatever is made to correlate drawing with any school subjects other than the shop.

With a few exceptions, the length of courses fits into the customary divisions of a school year, that is, courses are either one semester or one school year in length. The semester courses outnumber the year courses by the ratio of 180 to 136. The length of an individual class period, not counting the time between classes, is predominantly 90 minutes, or a double 45-minute period. A significant number of schools, however, use a basic 60-minute period.

Content of Courses

A list of instructional topics consisting of 44 items was checked by 138 teachers. Each teacher checked those topics which applied to his own classes, insofar as it was possible for him to do so, and also indicated the grade and semester in which each topic was presented. When these data were arranged in a table, it appeared that each instructional topic was taught in each semester of each grade from the ninth to the twelfth, inclusive. This seemed to show a surprising amount of variation, particularly since the instructional topics varied from those ordinarily found in beginning work to those of a rather advanced nature. The question which at once seemed to suggest itself was that a more uniform development and acceptance of standardized practice would be quite desirable.

In spite of the fact that a wide variation in the grade placement of various topics is apparent, there does seem to be a rather definite grouping of instructional topics by grades as determined by the grade placement of those topics receiving the highest frequency of mention. On this basis the following grouping meets with most favor as topics suitable for each grade: For the ninth grade, lettering, use of tools and instruments, simple three-view projection, simple working drawings, geometrical constructions, sections, dimensioning, inking, tracing, blue-printing, orthographic projection, and use of shop terms; for the tenth grade, developments, intersections, auxiliary views, sheet-metal drafting, screw threads, bolts and nuts, other machine fastenings, free-hand sketching from models, working drawings of machine parts, assembly and detail drawing, and different forms of pictorial drawing; for the eleventh grade, architectural drawing, both construction details and working drawings, or, as an alternative, some form of machine drawing; for the twelfth grade, machine drawing, including gears and cams, or more advanced work in architectural drawing.

An explanation of the wide variety of grade placement of different topics may be found in the following facts: (1) In practically all cases mechanical-drawing courses are reported as elective, (2) a large number of courses are offered in a combined form with a shop course, (3) courses are begun during all the different years of the high school, (4) pupils from different grade levels are enrolled in the same class. Instructors are confronted with vital problems of adjusting the content and arranging the instructional material to accommodate the unusually wide range of individual differences which occur.

Methods of Conducting Classwork

In answer to the question "Do you use a textbook?" 88 per cent of the teachers answered "Yes" and 12 per cent answered "No." Whether or not teachers included in their answers books which actually should be classed as reference books could not be determined. It is clear, however, that the use of a textbook is rather general.

A list consisting of six books comprises all the books used as texts which were reported with a frequency of 10 or more. The number of reference books which teachers have immediately available ranges from 0 to 50, with a mean of 15. Three schools, however, reported 100 or more reference books. About 23 per cent of the teachers have five or fewer reference books immediately available.

The data on assignment of problems indicate that, in general, problems are assigned regularly from the textbook as the predominating method, but this is supplemented to a large degree by occasional assignments by other means which, in order of frequency, are as follows: blackboard sketches, blue prints made from tracings from other sources, blue prints made from tracings prepared by the instructor, mimeographed sheets, and dictation.

About one half the teachers require all drawings to be inked directly on the drawing paper, while the other half require part of the drawings, usually from one fourth to one half, to be inked directly on the paper. Most teachers require some of the drawings to be inked on tracing paper or vellum, the predominating proportion of drawings thus inked being about one fourth. Practically one half the teachers require no inking at all on tracing cloth, while the others require only "enough to acquaint the pupils with the material."

Of the 136 schools which reported their passing mark, 38 per cent use 75, 24 per cent use 70, and 15 per cent use "D." The remaining schools use other values or combinations. Approximately 30 per cent of the teachers reported that they use a letter system of marking their own work, while at the same time the school uses a percentage system. A pupil's final mark is usually made up by a combination of daily work and class tests, although approximately 17 per cent of the teachers give the final mark on the basis of the daily work alone.

The different sizes reported for standard drawing sheets numbered 42. The usual sizes are 9 by 12, 11 by 15, 12 by 18, 15 by 22, 18 by 24, and 22 by 30. The model size is 11 by 15.

Approximately 72 per cent of the teachers do not attempt to keep their classes together on the same unit of instruction. Some type of individual instruction is the outstanding plan by which each student is allowed to go along at his own rate. Insofar as any effort is made to keep classes together, the usual method seems to be to assign harder problems or more advanced work to the better students. It is apparent that in class instruction teachers attempt to take proper recognition of individual differences.

Equipment

Out of a total of 135 schools, 110 schools report that they have one room equipped for mechanical drawing, 15 schools have two rooms, 4 schools have three rooms, 1 school has four rooms, and 1 school has seven rooms. Four schools reported that they have no rooms equipped for drawing but use either the bookkeeping room or the shop. The maximum number of pupils that may be accommodated in any one class as reported by 137 schools ranges from 9 to 40. The mean, as well as the median, is 23.

The adequacy of school equipment varies widely. The lack of blue-printing facilities is an outstanding deficiency. More than 40 per cent of the teachers consider their cabinet and filing equipment to be inadequate.

In general, schools require pupils to furnish items of student equipment that are consumed by use, while the schools themselves furnish those supplies which may be used time after time by succeeding groups of pupils. Approximately 30 per cent of the schools charge a fee of some kind for the use of certain items of equipment.

Teachers

In 73 per cent of the schools there is only one teacher of mechanical drawing, in 15 per cent of the schools there are two teachers, and in 12 per cent of the schools there are three or more teachers. In general, teachers have had reasonably satisfactory preparation so far as school training is concerned, 72 per cent being college graduates, 30 per cent being normal-school graduates, and about 11 per cent having had some other form of school training. In addition, 22 per cent of the teachers have had other preparation in allied kinds of practical work. Experience in commercial drafting is possessed by 27 per cent of the teachers. Other subjects are taught simultaneously with mechanical drawing by about 70 per cent of the teachers. When drawing is combined with another subject, the shop is the most frequent combination. There seems to be no one combination of drawing with an academic subject which may be called a prevailing one.

Conclusions and Implications

Inasmuch as the type of data called for in this study was almost wholly of a factual nature, it is believed that the results, inasfar as they affect the items referred to, may be accepted with a reasonable degree of confidence. The objectives of the subject contribute to the aims of general education as well as to vocational preparation. The content of courses as revealed by the instructional topics which teachers present in their classes and the grade placement of these topics is very much lacking in uniformity. The variation covers practically all topics and all grades.

This very fact, it would seem, suggests the difficulty as well as the desirability of unifying and standardizing work suitable for a given grade. It would seem that this alone would point to a fruitful field of endeavor for those interested in the subject. The wide variation in practice apparently points to the fact that many schools are making whatever adjustments their local situation requires in order to offer students some instructional opportunities in the graphic language. Mechanical-drawing teachers, facing the necessity in many instances of teaching other subjects, of adjusting instruction in their own subject to an unusually wide range of grade abilities and individual differences, and of coördinating the many instructional applications into a unified whole, need to bring to their work as wide and as varied a training, both of a general and specific nature, as it is possible to bring.

Junior-High-School Printing Course

Harold G. Crankshaw

Hine Junior High School, Washington, D. C.

A suggested outline for making the printing course offered in the junior high school more diversified.

A MORE diversified course of study in printing than the usual series of lessons in hand composition often given in the junior high school not only increases the interest of the pupil of normal or superior ability but gives a more comprehensive idea of the many occupations available in the printing and allied industries. Diversification, at the same time, increases the general educational value of the subject.

Printing not only represents the book and job printing, and newspaper and periodical publishing industries, but also the many allied industries, such as paper manufacture, ink manufacture, roller and machinery manufacture, advertising, lithographing, photo-engraving, stereotyping, electrotyping, bookbinding, intaglio printing, and others. In addition, printing offers very many general educational possibilities.

To the composition in type of copy about the subject matter studied in class (knowledge content of printing: history, mathematics, design, occupational information, etc.), some of the following or similar group and individual projects would aid in widening and developing the ability of the student. These prob-

lems and group activities can be added to a course of study with little or no additional equipment. Many can be adapted to shopwork making greater use of the manipulative and creative abilities in the short pre-vocational advisory course. Such jobs may include:

A. Folding, covering, punching, and tying a notebook in which to keep proofs or copies of projects; making small notebooks by stitching and tying, both flat and saddle; padding scrap stock for scratch pads, by punching and tying, or by stitching or gluing; folding school paper; and the like.

B. The making up of wood furniture to definite dimensions; simple lock-up to give idea of preparing type for press and to show importance of careful justification; drawing a chart showing sizes of wood furniture in cabinets; imposition layout of pages from folded sheets of paper; lock-up of linoleum block for proof.

C. The drawing of a chart, showing point sizes (width) of the common spaces from 6 to 24 point; cutting paper to show the most advantageous cut (with scissors on one sheet where stock is limited — and to avoid danger on paper cutter); a mathematics "bee" on point-system problems, the problems to be made out in advance by the instructor or asked by the opposing side.

D. The making of a color wheel with crayons or printers' ink, all from the three primary colors, preferably; illustrate correct color combinations with a given color through various color harmonies (complementary, contrast, etc.).

E. The cutting of linoleum blocks; designs, seals, simple free-hand illustration, silhouettes, two-color blocks.

F. The drawing of type-case layout; drawing of capital letter showing roman, italic, outline, and other styles of type face; lettering on booklet covers; collecting of examples of advertisements which illustrate balance, harmony, etc.

G. The feeding of blank sheets of stock on the press with check on time, misfed, and missed sheets; live jobs slowly fed; washing, oiling, and inking press. (Bookmarks and similar work not only give students live jobs but advantageously use up scrap stock which otherwise would be wasted.)

H. Coördinate printing with other subjects of the curriculum; composition of English themes; cutting linoleum blocks of drawing classwork; binding student's papers and notes; making small notebooks for special subjects; composition of short historical sketches, interviews, vocational-guidance studies; composition of commonly misspelled words; marking a page of type where all punctuation marks have been omitted; reading and marking proof.

J. Print special class or individual projects: student name cards; composition of original or memorized poetry; class newspaper (have class elect editors, write copy, etc. — this works well while studying newspaper occupations); making of chart showing derivation of the alphabet; make models of early clay tablets, scrolls, etc.; charts of early printers and contributions to development of industry; class booklet of themes, set up and bound together; work on school paper; inspection trips to printing plants and newspapers; trips to library or museum where early books are exhibited; making of paper or ink.

The choice of the projects outlined in the foregoing would depend largely upon the ability of the class to assimilate the material. A high-ability group could complete more projects and a wider scope of work, while a low I.Q. group might need almost all manipulative exercises of an elementary character.

Correlation of Achievements

Riley S. Williamson

Baltimore, Maryland

A study made in the elementary schools of Baltimore, to determine the correlation of achievement in woodwork, sheet-metal work, and electricity.

THE study herewith presented was made to discover the relationship of fifth-grade pupils' gains in knowledge of woodwork, sheet metal and electricity as measured by objective tests of known validity and reliability devised by the author.

The largest single common element in all the gains is mental ability, for when the effect of this factor is held constant, the correlations of the gains in the several subjects become negligible. The correlations between the gains in woodwork and sheet metal was thus reduced to .05; that between woodwork and electricity to .25; and between sheet metal and electricity to —.07.

A sampling of one hundred pupils of known mental ages discloses the lowest relationship between mental age and knowledge of principles of woodwork, the correlation being .72; the correlation between mental age and knowledge of principles of sheet metal being .81; while the correlation of .88 between mental age and principles of electricity discloses the highest relationship.

Whatever, therefore, permits pupils to make gains in achievement in woodwork, sheet metal, and electricity, seems to be the same general ability which enables them to achieve in the other school subjects wherein mental ability is a potent factor rather than a special ability common only to the three industrial-arts subjects.

The coefficiencies of correlation reveal that there is a significant positive relationship between pupil gains in achievement when the gains, following ten weeks' instruction in sheet metal, were compared with the gains following a corresponding period of instruction in woodwork and in electricity. The correlation between gains in woodwork and sheet metal was found to be .603, between woodwork and electricity .707, and between electricity and sheet metal .694. These correlations may be interpreted as being almost wholly due to the common influence of mental age, their value being an empirical one for purposes of prediction.

The lowest correlation was found between gains in woodwork and gains in sheet metal, indicating probably that there are fewer common elements between these two subjects as compared with the other combinations — woodwork and electricity, and electricity and sheet metal.

On the basis of the correlations found, the regression equation for each pair of variables was computed. Using this equation, it was found that if a pupil's gain in one subject is known, his probable gain in the other will show a close correspondence to the gain from which it was predicted.

From the statistical viewpoint, the data are highly reliable because all of the correlations substantially exceed their probable errors.

This study reveals the need for further investigation of the following problems:

1. A study, similar to this one, of the correlation of achievement in woodwork, sheet metal, and electricity of pupils of increased maturity.

2. The relationship of intelligence to gains in achievement in elementary, in junior-high and in senior-high-school industrial arts.

3. A comparison of achievement in industrial arts versus academic subjects.

INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

J. J. Metz, Editor

How Educational Costs Have Been Cut

To what extent schools have cut their expenditures is shown by the study entitled *Per Capita Costs in City Schools, 1932–33* which has just been released by the Federal Office of Education.

The report covers 299 typical cities distributed throughout the country. One third of the cities show a drop of 15 to 30 per cent in the per-pupil cost during the year. The average drop is 22 per cent.

The average total cost of educating a child dropped from $113.03 for 1932, to $87.65 for 1933. That this reduction of costs is widespread is evidenced by the fact that 96 per cent of the cities studied show decreased expenditures.

This and other studies also show that the current expenses for operating city and rural schools in America for 1933–34 are about $368,000,000 less than they were in 1930. While there are upward of 250,000 more pupils in school than there were in 1930, the total number of teachers has been decreased by about 18,000. Few school buildings have been added, and few of the old ones have been altered to accommodate the increased pupil load.

A part of the reduced school cost is due to the fact that teachers' salaries, on the average, have been reduced about 14 per cent. In some cases the reductions run as high as 40 to 45 per cent.

Some of the cities, in order to reduce expenses, have eliminated or reduced kindergartens, playground activities, school supplies, night and adult classes, industrial-arts and vocational work, homemaking courses, and summer schools.

Whether the reductions made represent cuts based on real economy, or whether they were made because of pressure exerted by individuals who through ignorance or from selfish motives refused to consider the effect of what they demanded, will be disclosed only as time passes.

Rehabilitation and the Depression

It is surprising to hear that during the past year, when able-bodied men found it difficult, if not impossible, to find jobs, that more disabled men and women were made self-supporting through the vocational rehabilitation program carried on under the Federal Vocational Rehabilitation Act than in any previous year.

The rehabilitation of persons disabled through accident or disease is truly a worth-while undertaking. Under the act, this work has a threefold function. Not only must the disability be removed, or at least minimized, but training also must be given, and placement must follow.

During the year, 11,000 disabled workers have been qualified for employment. About 50 per cent of these have been actually placed. Besides the foregoing, 25,300 rehabilitation cases are in the process of being trained in the various states.

With the completion of plans under consideration at present, a greater number of the rehabilitation men and women may be given employment, thus making them self-supporting and removing them from the public relief rolls.

A Vacation Thought

The wise teacher is looking ahead and is planning for the summer. Present indications hold out little hope for opportunities of employment whereby the decreased and depleted income of the past year may be enlarged.

Under such conditions, it is difficult, of course, to plan on anything that requires an outlay of money. Nevertheless, professional improvement is a necessary part of the teacher's year, and a summer-school session at a good teacher-training institution is the best way of assuring oneself that this improvement is taking place in fact and not merely in fancy.

It is not too early, therefore, to start with plans for the coming summer. There are but a few months of the school year left. For the teacher who starts now, there is still time to obtain all the needed information for planning a summer course that will more than outweigh the disappointments and worries incident to schoolwork during these troublesome times.

Anyone who has attended summer school knows that while it entails strenuous effort, it also presents much that is enjoyable. It is advisable, then, to begin thinking about this subject. Incidentally, there is still time to make budget provisions to cover the expenses entailed by summer-school attendance.

Trained Artisans Still in Demand

The fine new automobile models which arouse the envy of those of us who cannot afford to buy them, have proved conclusively that skilled workers are still in demand and that vocational education has a real duty to perform.

When the automotive industry decided to do some drastic redesigning of its various models, designers, engineers, and draftsmen were put to work at once. After these men had worked for some time, patternmakers, molders, foundrymen, blacksmiths, machinists, toolmakers, heat treaters, and others got into action, and presently the first few models were ready for experimenting and testing. Then came the heart-breaking job of making revision after revision. Sundry parts had to be redesigned and again tried out, but finally "The Model" which received the approbation of those

in authority, was finished. Then manufacturing was ready to begin in earnest.

Before much could be done, however, jigs, special tools, single and multiple patterns of metal and wood, punches and dies, and many other manufacturing and testing aids and devices had to be designed and made. The purchasing department, in the meantime, was busy locating sources of supplies and placing orders for huge quantities of the desired raw material.

To attend to the mass of details involved in all of this work takes trained men. This is especially true of the toolmakers whose duty it is to prepare the special tools, jigs, punches, and dies.

When the models, recently shown the country over, were in process of development, practically all of the skilled toolmakers in the larger automobile centers were employed. Then when the supply did not fill the demand for these workers, others from neighboring cities were imported and yet the demand was not filled, and some of the work had to be parceled out to mechanics in the more distant communities.

More than one employer asked the question: "Where are we going to get the skilled men we need, when business gets back into its own?" Since the depression started, many of the experienced workers have died. The vacancies thus produced in the ranks of their crafts must be filled, because, as was shown in the automobile industry, the skill of these men again will be in demand. Industry, at present, is doing nothing to train men to fill the vacancies produced by sickness, death, and other causes.

Little will be gained if the training of these men is postponed until they are needed. It devolves, then, upon the school to do this job. True, industry does not now, and probably will not later appreciate just what has been done for it by the school. But the job is there. Vocational education is a necessary part of what the school must offer, even though there are numerous forces at work, at present, to undermine or to abolish it.

The trend of the times seems to predispose everyone to forget about the future and to concentrate on the present only. The incident of the toolmaker shortage illustrates how dangerous this procedure may become.

A Memorable Birthday

January 30 was made memorable this year by the manner in which Americans celebrated the birthday of their illustrious president. At no time in the history of our country has the birthday of our chief executive been celebrated in such a general way and with such a humane and noble purpose in mind. As was to be expected, Franklin D. Roosevelt acknowledged the nation's gift to the suffering children in his characteristically gracious manner.

The gift truly honors both the president and our country, and its results in salvaging the lives of many children will be, it is hoped, proportionally large.

Few of our presidents have succeeded in so short a time to impress upon everyone the feeling that their every act is based on an honest and earnest endeavor fearlessly to follow Abraham Lincoln's immortal words: "Let us have faith that right makes might, and in that faith let us dare to do our duty as we understand it."

Vocational education is especially near to the president's heart. This is proved by a statement found in one of his speeches: "We must increase vocational education for those children who otherwise would not receive adequate training. My own observation leads me to believe that in many parts of the country we have tended to an educational system devised too greatly for academic training and professional careers. We know that already many of the professions are oversupplied and it is a fair guess that during the coming generation we shall devote more attention to educating our boys and girls for vocational pursuits which are just as honorable, just as respectable, and in many instances just as remunerative as are the professions themselves."

It is to be hoped that an all-wise Providence will be specially kind and helpful to this man who is so strenuously and courageously trying to solve the problems of our country. May he gain strength in his fearless fight for the underprivileged, and may he enjoy many more happy birthdays.

Evolution of Teaching Material

The second semester of the school year is now well under way. It is time to critically examine the results of what has been accomplished during the semester just passed. There may be opportunities for making improvements and now is the time to inaugurate them.

There is always the danger of postponing the making of revisions with the hope that vacation time will present more opportunity for carefully thinking them through, and more time for the preparing of new instructional material, devising a more effective teaching method, or more leisure for gathering and preparing illustrative material.

Just as with the initiation of a new habit, the changes in the course must be attacked with energy and direction, otherwise they will not materialize at the time when the need of them is most clearly apparent.

It is true, the hurry and bustle of starting new classes is not conducive to calm thinking. If the present shows the need for improving the course, it also is the time to make the required changes. Planning to make them a few months hence — when the thoughts about these needs have become vague and indefinite, is clearly not conducive to securing the right results.

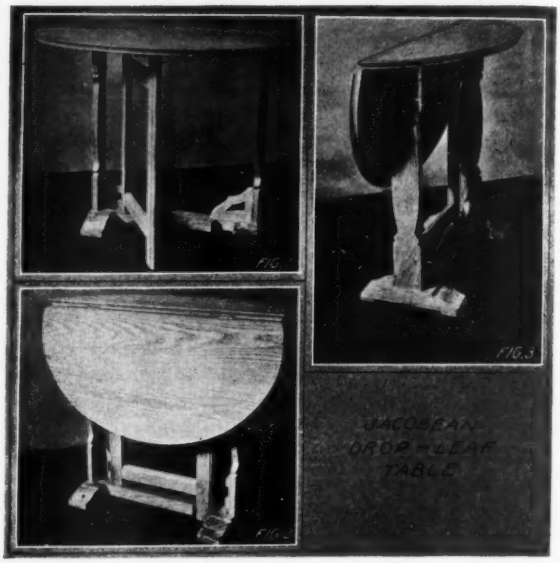
All of these statements may be self-evident and trite, and yet the time for making revisions is ever present. Calling attention to it, therefore, also is a necessity. We are living in a changing world, and neither we nor our work may ever become stationary.

Problems and Projects

JACOBEAN DROP-LEAF TABLE

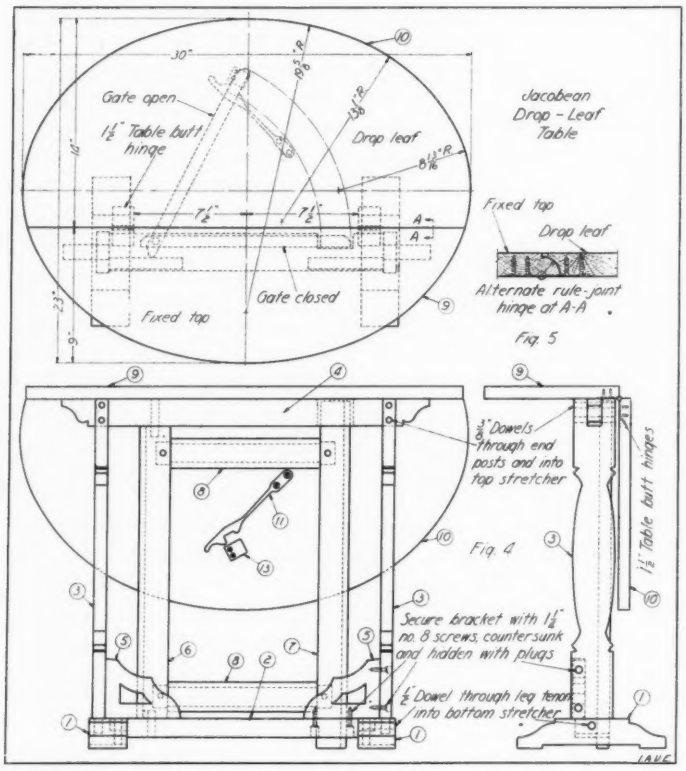
Donald A. Price, Chicago Heights, Illinois

This design is based on an antique oak table ascribed to the Jacobean period. The trestle-type supports, and the mortise-and-tenon joints secured with wooden pins, indicate that it belongs to the transition period when the knock-down board on trestles was being transformed into a heavy and clumsy, but permanently set-up table. With refinement in living conditions, smaller tables came into use, and among others, the gate-table with drop leaves. This type proved so useful that it has persisted through many "periods" down to the present day. We see many examples among our own Colonial antiques which closely resemble this particular model in outline and method of construction. Indeed, if made of maple this table would be perfectly at home in "Early American" surroundings. When open, as shown in Figure 1, the top is elliptical in shape, the larger portion of the ellipse being formed by the drop leaf. With this down as in Figure 2, and a piece of tapestry thrown over it, it should form an interesting item of decoration in itself, aside from its intrinsic usefulness. In the position shown in Figure 3, it might be used effectively at the end or back of a davenport.



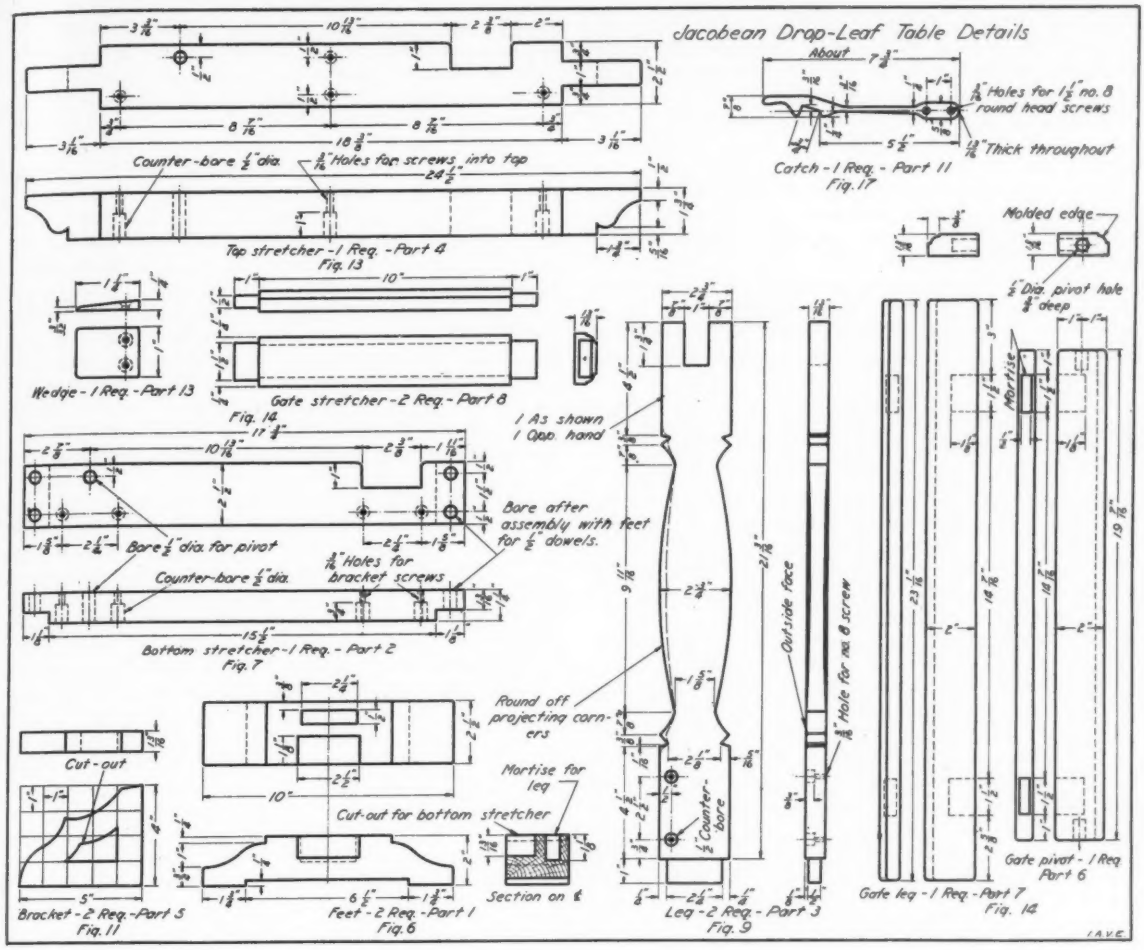
An inspection of the assembly drawings, Figures 4 and 5, will show that the mortise-and-tenon joints are secured with pins dressed off flush with the surface. Where screws are used they are counterbored and concealed with flush dowels.

In making the model illustrated, the construction was started with the feet, Part 1, detailed in Figure 6. Then the bottom stretcher, Part 2, was made as detailed in Figure 7, except that the ½-in. holes were not bored through the tenons at each end. These tenons were made a drive fit in their sockets. The bottom stretcher and the feet were then assembled with glue and clamped up as shown in Figure 8. The long clamp, applied first, seated the tenons lengthwise, and the C clamps, through the protecting wood blocks under the pipe, drew the joint together in the other direction. After the glue had set, two ½-in. holes for dowel pins were bored through both stretcher and feet and dowels glued in place. These pins were cut longer than necessary and left projecting at each end, to be dressed down flush after the glue has set.



The legs, Part 3, Figure 9, were first squared up, then the tenon was formed on the lower end, and then the slot on the upper. Note that the counterboring of the holes for the bracket screws off center makes it necessary to make a right-hand and a left-hand leg. Then the scrolled outline was bandsawed and sanded, as shown in Figure 10. By the judicious use of this sanding attachment, the projecting edges and corners that would be exposed to natural wear during the course of many years, were roughly rounded off, as indicated in the section shown in Figure 9. As this attachment works across the grain, it is, of course, necessary to finish up with fine sandpaper rubbed with the grain. This same idea of simulating wear should be carried out over the whole piece, not with the purpose of deceiving anyone as to its age, but because the softly rounded outlines in themselves add to the charm of the table. The legs were next glued into the feet, and a ½-in. dowel set through the leg tenon and continuing on into the tenon on the bottom stretcher.

The brackets, top stretcher, and gate parts shown in Figure 11, 13, and 14 were made next. The gate, consisting of pivot, Part 6, leg, Part 7, and stretchers, Part 8, was assembled with glue and ⅜-in. pins through the joints, as shown in the front view, Figure 4. The brackets were secured with screws and glue and the top stretcher fitted in place. The pivot dowel pins, a tight fit in the stretcher, were driven in their holes to project not more than a half inch. The project-


Jacobean Drop-Leaf Table Details
Counter-bore ½" dia.
⅜" Holes for screws into top
Top stretcher - 1 Req. - Part 4
Fig. 13
Catch - 1 Req. - Part 11
Fig. 17
⅜" Holes for 1½" no. 8 round head screws
½" Thick throughout
Molded edge
½" Dia. pivot hole ⅜" deep
Wedge - 1 Req. - Part 13
Gate stretcher - 2 Req. - Part 8
Fig. 14
1 As shown
1 Opp. hand
Bore ½" dia. for pivot
Counter-bore ½" dia.
⅜" Holes for bracket screws
Bore after assembly with feet for ½" dowels.
Bottom stretcher - 1 Req. - Part 2
Fig. 7
Outside face
⅛" Hole for no. 8 screw
Mortise
Round off projecting corners
Cut-out
Mortise for leg
Cut-out for bottom stretcher
½" Counter-bore
Section on ℄
Bracket - 2 Req. - Part 5
Fig. 11
Feet - 2 Req. - Part 1
Fig. 6
Leg - 2 Req. - Part 3
Fig. 9
Gate leg - 1 Req. - Part 7
Fig. 12
Gate pivot - 1 Req. Part 6

ing portion was then sanded down so that they turned easily in the holes in the pivot leg of the gate. After the proper swinging of the gate was verified, the top stretcher was glued and clamped in place, with the gate still in position.

Then attention was turned to the completion of the elliptical top, consisting of the fixed top, Part 9, and the drop leaf, Part 10, Figures 4 and 5. The original table edges were square in section throughout, but its appearance, especially with the drop leaf down, will be greatly improved by using the rule joint shown at Section A-A in Figure 5. A table butt hinge, with the pivot mortised in the fixed top and the leaves set in flush with the underside of the top and drop leaf, should be used. This type of hinge has one leaf longer than the other, to bridge over the projecting edge of the stationary top. If molding cutters are not available for cutting the rule-joint, it may be formed with the aid of a template by roughing out on the circular saw to the approximate contour and finishing up with block plane on the convex side and half-round file and sandpaper on the concave side. It should be noted that the contour of the rounded surfaces should be a true radius, centered on the pivoting point of the hinge. With the hinges still in place, the ellipse was laid out by means of the radii shown in Figure 5. It was then cut out on the band saw and finished to a smooth curve with the belt sander. The edge was next molded as shown in Figure 15. If this molding equipment is available, it is recommended that the projecting contour shown in Section A-A be run around the curved edge in preference to the undercut section to be seen in the photographs. If tool equipment is lacking or if historic accuracy is desired, by all means leave the edge square.

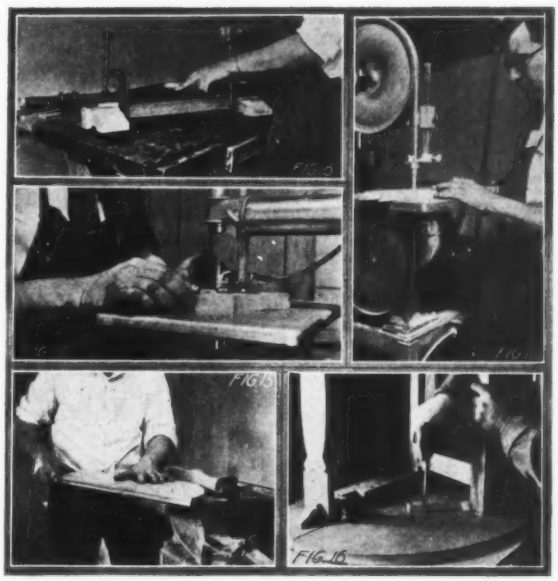


Fig. 8. Clamping up the feet and bottom stretcher. Fig. 10. Sanding with the belt sanding attachment on the band saw. Fig. 12. Jig sawing the bracket, using the saber blade. Fig. 15. Cutting the top molding. Fig. 16. Fastening the maple spring in place.

After the top was completely sanded, it was fastened to the frame with screws, as shown in Figure 16. The maple spring catch, detailed in Figure 14, and the wedge were next located in their proper position. Care must be taken to place the spring catch so that its rear end is cleared by the swing of the gate, and that it does not foul the upper crosspiece in the gate when the drop leaf is down.

After a final sandpapering, penetrating dark antique stain was applied, after which a rather thin mixture of filler, also stained dark, was wiped on with the grain so that the pores remain only partially filled. A sealing coat of thin shellac was then applied, and the entire job was given three coats of well-rubbed wax. A more permanent finish may be given by applying two coats of rubbing varnish after the shellac coat. When the varnish is thoroughly dry, it should be rubbed with pumice and oil to a dull luster.

PERSPECTIVE SKETCH BOARD

Frank L. Wade, Brewster Vocational School, Tampa, Florida

The accompanying illustration shows a layout of a sketch board, which, if accurately made, will enable one to draw a very neat and correct perspective sketch even if one has little or no knowledge of the rules governing perspective drawing.

The first requirement is a suitable drawing board. A 16 by 20-in. board may be used, and if made of a three-ply, basswood panel stock, it will be found quite satisfactory.

Exactly in the center of the board a line is lightly drawn lengthwise of the board. With this line as a center, an arc is drawn, using a 11½-in. radius, as shown. The highest point of the arc is to be 2¾ in. from the left-hand edge of the board.

The *horizon line* is then drawn ⅞ in. above the center line, and 3 in. above the horizon line is drawn the *picture plane line*. The *ground line* is drawn at a point 6 in. below the horizon line. The perpendicular *line of height* is drawn 4⅝ in. from the right-hand edge of the board. It extends from the picture plane to a point 1¾ in. below the ground line, at which point the *station point* or *point of vision,* represented on the drawing by S.P., is located.

Above the picture plane and with the lower corner resting on the picture plane, where it is intersected by the line of height, is drawn the *plan*. This plan is represented by a portion of a rectangle set at an angle of 63 deg. from the picture plane. The plan is divided into ¾-in. squares. From where the lines of the squares intersect the outside edge of the plan, lines are drawn down to the picture plane. These lines, if continued, would all meet at the station point.

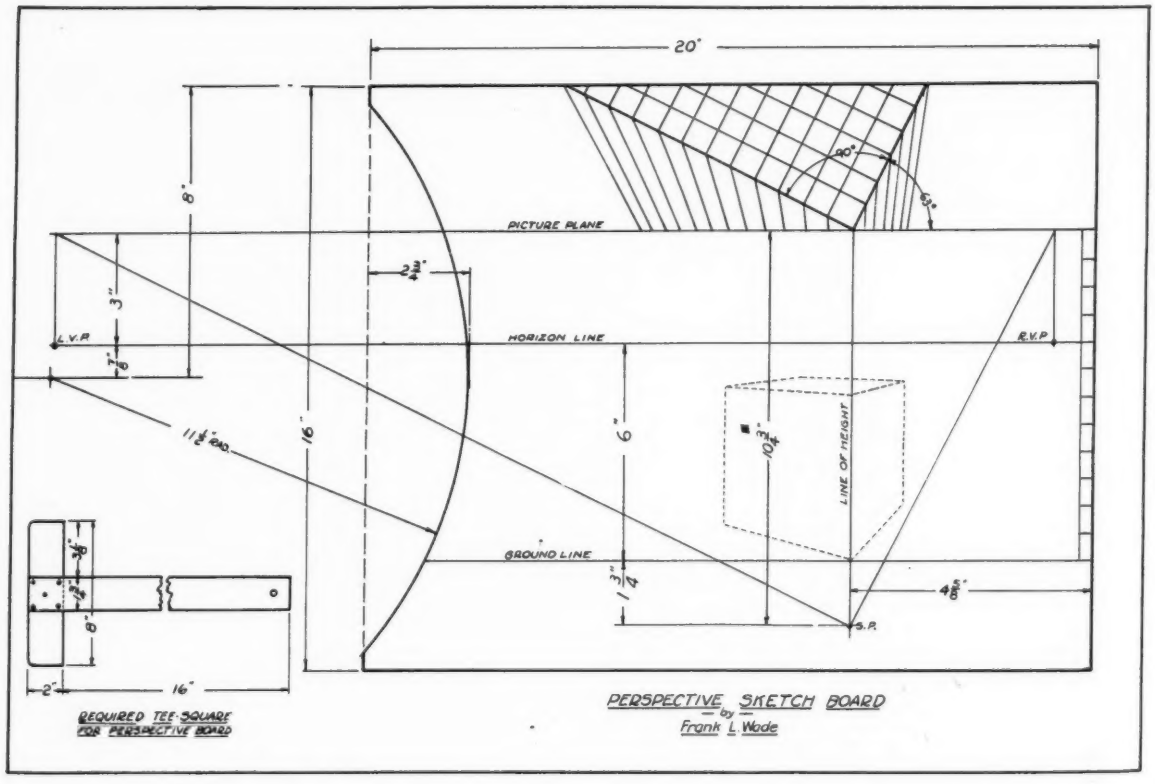
Along the right-hand edge of the board is shown a *scale* with divisions at every ¾ in. This scale is only for the purpose of determining the height of the object to be drawn and may be omitted if desired.

The next step is to locate the *vanishing points*. To do this it will be necessary to draw lines from the station point and parallel to the sides of the plan. From where these lines meet with the picture plane, a line is dropped straight down to the horizon line and, at the points where they meet the horizon line, are located the vanishing points. These points are called the *right vanishing point* (R.V.P.) and the *left vanishing point* (L.V.P.).

And now we come to the reason for the arc mentioned at the beginning of this article. It will be seen that the L.V.P. comes several inches beyond the boundary of the board. By cutting the board on the line of this arc, on a band saw, it will be possible to slide the T square used, along this arc and have all lines drawn along the top edge of the T square converge at the L.V.P. This relieves the necessity of a large unwieldy board.

In order that the board will function properly, however, it will be necessary to make the T square to the dimensions shown in the illustration.

In using this perspective board, tack the sketch paper on the board with the bottom edge of the paper slightly above the station point. Draw a vertical line in the position of the line of height. All upright measurements are taken on this line using ¾ in. as the basis for either feet or inches, according to the size of the object to be drawn. If the scale shown in the illustration is used, carry the heights across from the *scale* to the *line of height*.



The measurements for the front and the end are taken from the plan. Determine the size of these two sides on the plan and carry this point down toward the station point until it meets the picture plane. From there, drop straight down to the drawing. All lines forming the end will meet at the R.V.P. which is located on the board. All lines forming the front will meet at the L.V.P. and are drawn along the top edge of the T square as it is held with the head against the curve of the arc.

A cube, 6 by 6 by 6, is shown by dotted lines, drawn according to the previously described method. No drawing is too complicated to make on this board.

The main requirement in laying out the perspective sketch board is accuracy. After the board is once made, perspective drawing becomes a very simple matter, and with a little practice one may become adept at making this type of drawings.

AN INTERESTING TURNING PROBLEM

F. Clarke Hughes, John R. Rogers High School, Spokane, Washington

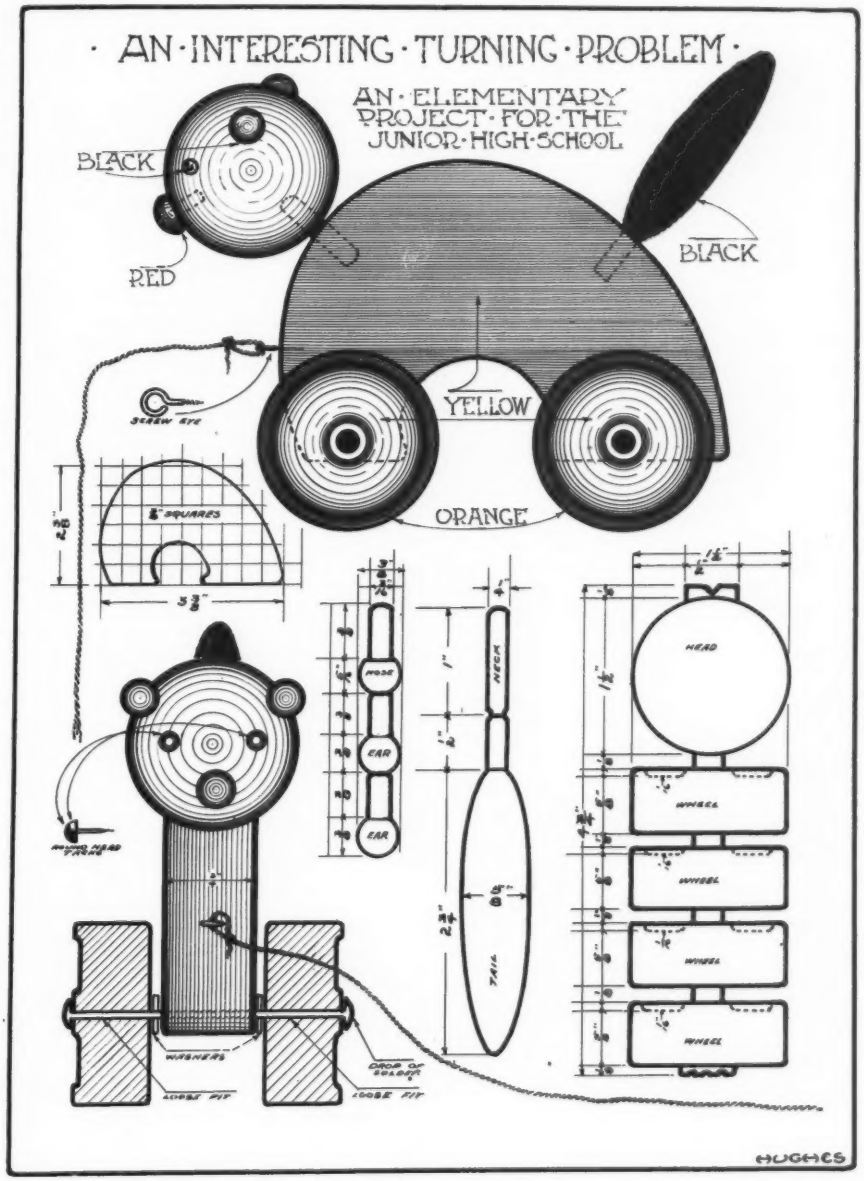
The funny little toy shown and described in this article is one that will interest the younger boys as well as the older ones, because there are very few students, even those in the high school, that are too old for working on toys. Combining as it does the elementary principles of wood turning, this problem is one that fits very well into the junior-high-school course.

The main parts of the problem are turned in three pieces, as shown in the drawing. The largest of these parts conforms very closely in general shape and form to that usually done as the beginning exercise in most beginning lathe courses. The smaller parts and the sphere for the head will, perhaps, be a little difficult, but not too much so considering that the pupil will be found with an interest in the problem sufficient to aid him greatly in the production.

The problem, when all shaped and fitted, should be given several coats of bright-colored lacquers or enamels. The colors should be applied before the wheels are put in place permanently, because then the painting can be done so much more easily. The colors shown in the drawing are suggested as the best scheme, though other colors may be used just as satisfactorily if they are bright and clear.

A bright-colored cord should be attached to a screw eye for the small child to use in leading the toy.

This toy is well suited as a production job where a large number are to be made for distribution to orphans, needy, or sick children, as Christmas gifts.



A SUCCESSFUL WREN HOUSE

A. D. Mowery, Industrial-Arts Instructor, Rumson, New Jersey

For a wren house to deserve the term "successful," one must have proved that it will attract the birds for which it is designed. The wren house described in this article has been tried out over a period of several years in various localities and has attracted wrens where previously they had declined to build in other houses intended for them. Much thought has been given to make this wren house attractive and desirable, as will be noted by the following points:

1. Safety from marauding cats, squirrels, and other natural enemies. Since this wren house is suspended from a limb, it is entirely free from molestation, and it has also a slight swinging motion which the wrens apparently consider an advantage.

2. It is easily erected. When the wires are twisted about a branch in the desired location, it is ready for occupancy. A piece of discarded aërial wire may be used for this purpose.

3. The diameter of the entrance hole is correct and permits easy entrance, and at the same time prevents English sparrows from taking possession. The absence of the conventional perch also is an advantage, since the wrens cling to the notch

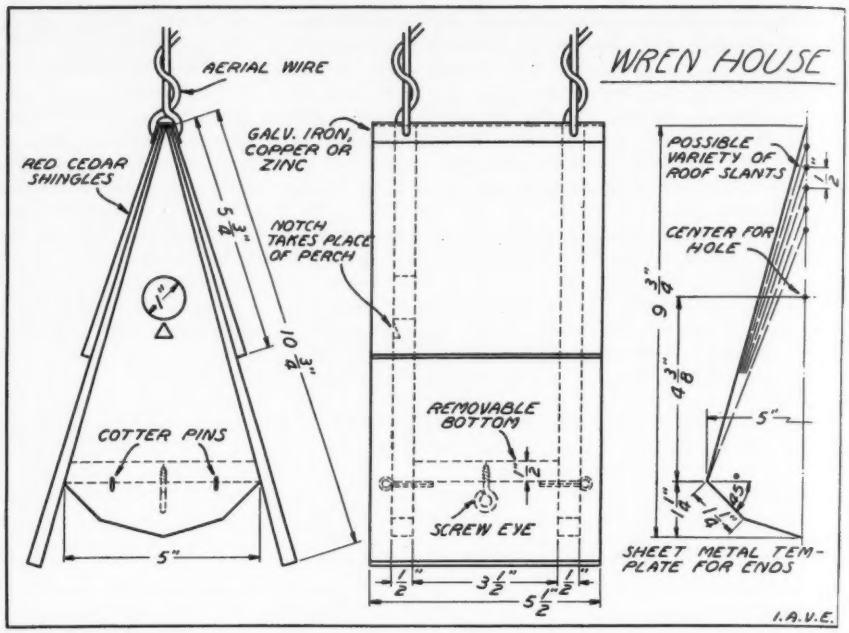
which is cut for that purpose. The usual perch seems to be more of an advantage to the wren's feathered enemies than to the wrens themselves.

4. Inside dimensions and depth of cavity from the entrance hole is correct according to experiments and to government specifications.

5. It is easily cleaned. After the wrens are through for the season, the four cotter keys should be removed allowing the bottom to drop; then the old nest may be removed and the bottom replaced.

6. Because of the sharp pitch of the roof, rain is quickly shed and dampness soon disappears. Ventilation and drainage holes are provided.

7. Method of construction. Make a cardboard or metal template as shown. Since front and back are to be exactly alike, tack two ½-in. boards together and cut both pieces in one operation. By marking one half and then turning the template over the design for the bottom will not only be equalized, but the dimensions will be correct. The object of "suggested pitch" holes in the template is that one may either adapt the size to small pieces of available material, or, if an error is made while cutting, merely reduce the size, using the next nearest "pitch mark." If flat-headed copper nails are used, rust will be avoided. Boards ¼ in. thick may be used for the roof instead of a cedar shingle, as illustrated. The best material to use is cypress, as this does not require painting. It has also been learned that if a piece of red cedar is incorporated somewhere in the construction of the house (preferably the floor), the house will attract wrens even more quickly than those not containing cedar. It is believed that the aromatic cedar has the effect of repelling vermin, a decided advantage to the wrens.



Made of good materials, this wren house will last for years and will amply repay the maker for his trouble. It is quite generally known that wrens are friendly, musical, industrious, beneficial, and interesting friends to have about one's premises. They will repay anyone, many times over, for the rental of their residence by their cheery song, and by consuming countless destructive insects.

DON'TS FOR THE ELECTRICAL PUPIL

Edward B. Flaherty, Phillips Brooks School,
Boston, Dorchester, Massachusetts

1. Don't throw screws in the screw box at random. Put them in their allotted places.

2. Don't start screws with a hammer when connecting delicate fittings. Use a brad awl.

3. Don't use a wooden-handle screw driver as a cold chisel.

4. Don't oil a hack-saw blade when cutting conduit.

5. Don't hammer on the tin snips while cutting a piece of metal.

6. Don't drill a hole in metal unless you centerpunch the hole first.

7. Don't light a leaking alcohol torch, or one that is wet with alcohol on the outside.

8. Don't work on a stepladder until you have made sure that it is safe.

9. Don't use a wood screw in machine-tapped holes.

10. Don't try to punch holes through a metal cabinet. Drill them instead.

11. Flat countersunk screws are used to secure fittings and boxes to a surface; therefore don't use roundheaded screws.

12. When making the electrolyte for a lead battery, don't put the acid first into the mixing receptacle.

13. When charging a storage battery, don't cause the current to enter by the negative battery terminal.

14. To test any battery or wires that carry electricity, don't use a voltmeter of the expected rating. Use one of a higher rating.

15. When testing a battery, wired in parallel, for its amperage, don't use the ordinary voltmeter.

16. Don't touch your eyes with soiled hands, especially while handling acids and salts.

17. Don't touch any wires, whether live or dead, before you ask the instructor.

18. Don't leave idle wires connected to the binding posts of a cell, a battery, or the lighting circuit.

19. If it is possible to cut off the current, don't take the risk of working on a job with the current on.

20. Don't get in the habit of testing fuses in place by the feel of your fingers. Use a two-lamp test set.

21. Don't connect the secondary winding of a bell transformer to the 110 a.c. line. Connect the primary to it.

22. Don't use fuses of a higher rating than 15 amperes to protect the branch circuits that are employed for lighting purposes.

23. Don't put a cent behind a blown fuse.

24. Don't tie a circuit breaker if it keeps on tripping. Find the trouble in the circuit that it protects.

25. Don't use an electric wire that is nicked.

26. Don't connect enamel insulated wire under the binding posts without scraping it at the point of contact.

27. Don't try to break off a wire if the lugs or connections of the device have no apparent mechanical strength.

28. Don't tighten a joint by squashing the turns of wire.

29. Don't cut the wires close to a transformer, or to a pigtail receptacle. Try to preserve these terminal wires as best you can.

30. Don't be stingy when applying rubber and friction tape. See that the joint is well insulated.

31. When soldering electrical joints, don't use muriatic acid as the flux.

32. Don't forget to insert the ⅛-in. insulating bushing in the cap of a socket, if the socket is to be suspended by the cord.

33. Don't make a rosette knot passed the rosette, but inside the neck of the rosette itself.

34. Don't use receptacles, or fittings that have stripped threads in their connections.

35. Don't put through an R.C. wire in a cabinet or junction box without passing the wire through circular loom, or using a ½-in. insulating bushing in the hole.

36. Don't be careless when handling porcelain, glass, or fragile instruments.

37. Don't lose the machine screws that were given you to fasten the switch spider to the switch body. Return these screws to the stockroom screwed in the switch spider.

38. Don't let any part of a knife-type switch get too loose.

39. Don't screw out the binding posts of any device unless lugs are used, or loops made (if the wire is comparatively heavy).

40. Don't attempt to use broken or cracked fittings for permanent installations.

41. Don't punch out the knock-outs of a junction box before you make sure where the box is to be placed and where the BX cables enter.

42. Don't tighten a BX connector until the BX connector is rigidly secured to the junction box.

43. Don't try to thread conduit by holding the conduit in a machinist's vise.

44. Don't measure any small object from the edge of a rule.

45. Don't connect ammeters across line.

46. When finding the voltage of the field of a motor, don't open the line circuit of the motor. Always disconnect the volmeter first.

47. Don't allow any magnets in close proximity to a wattmeter while it is in operation.

48. Don't fail to use two 110-volt lamps in series, or a 250-volt lamp when testing for bad fuses in a three-wire system.

49. Don't hang fixtures unless they are tested for short and open circuits and grounds.

50. Don't test a bell by connecting it to the house lighting circuit.

51. Don't test a radio tube on the house current, or on a 45-volt battery.

52. Don't connect the small motor supplied with the erector set to the house current. Use a dry cell.

53. If a motor is in a good running condition, and does not start when the current is applied, don't turn the shaft by hand. Open the motor line circuit and turn the shaft a quarter of a turn by hand. The motor will start, this time, when the current is put on.

54. Don't clean a commutator with a piece of emery cloth. Use a piece of sandpaper.

55. Don't stop a d.c. motor by pulling back the arm of the starting rheostat. Open the motor line switch.

56. When oiling the bearings of a motor, don't let the oil overflow and find its way into the motor.

57. Don't operate a d.c. series motor without having a load connected to it.

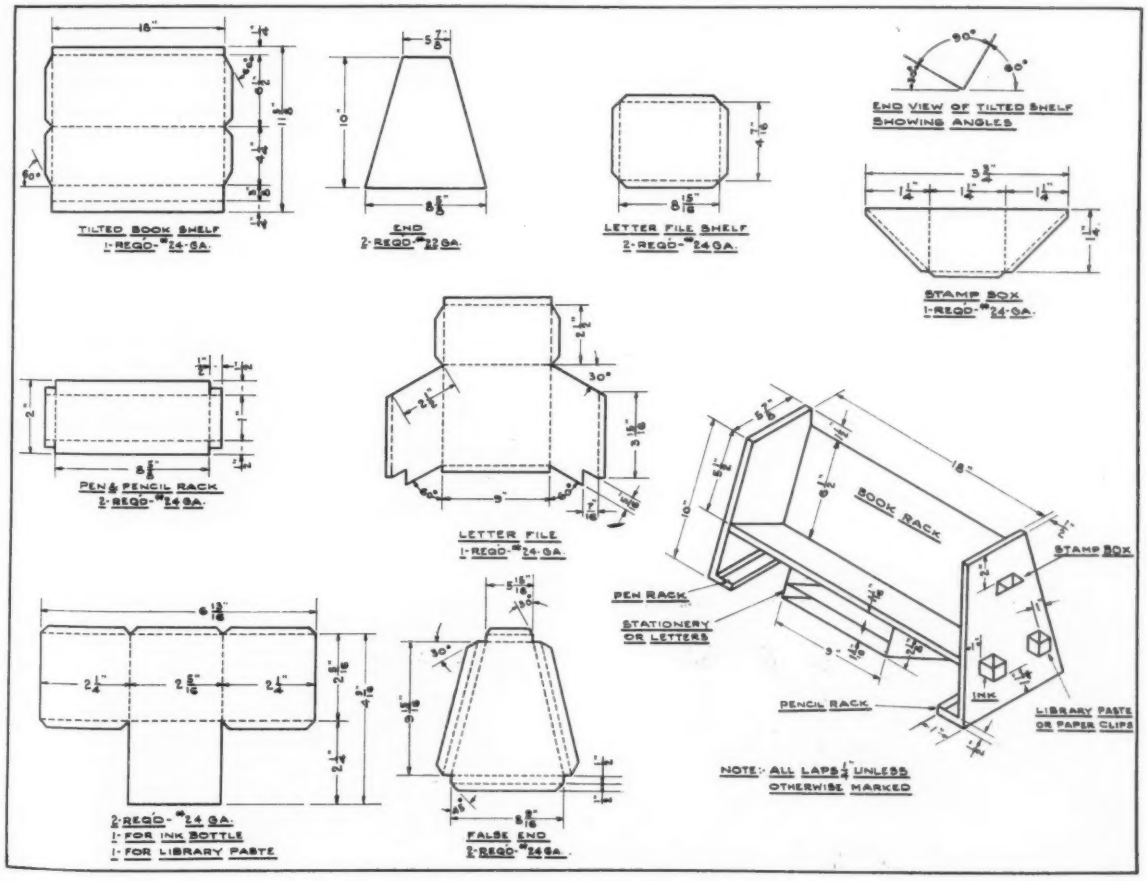
58. Don't operate a d.c. shunt motor with its shunt field open.

COMBINATION BOOK RACK AND DESK SET

C. H. Niemann, Hammond, Indiana

Since sheet metal is becoming quite a factor in the manufacture of furniture of all kinds, it may be a good policy to try to interest students in such sheet-metal projects. It was with this idea in mind that the bookrack and desk set was designed and made in the sheet-metal shop.

The isometric view and developments given make it easy for anyone to make such a bookrack. It should be finished with at least two coats of enamel. If the rack is to be placed on a highly polished desk, strips of felt should be glued under the ends, or the set may be placed on a blotter pad.

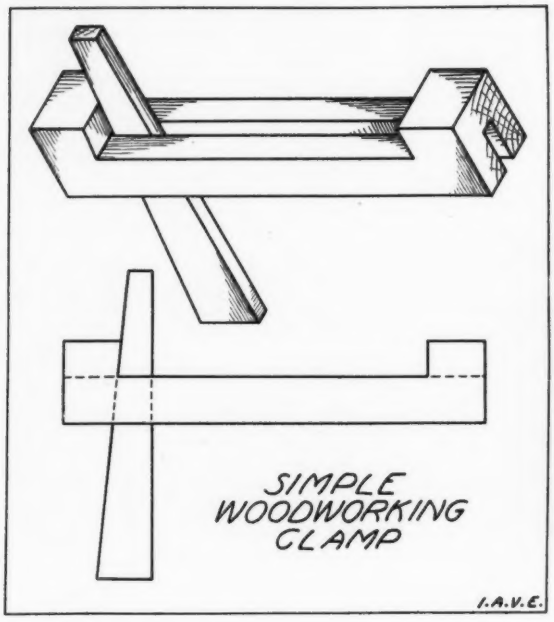


Details of combination book rack and desk set

SIMPLE WOODWORKING CLAMP

M. A. Neudecker, Public Schools, Albert Lea, Minnesota

The clamp described and illustrated herewith will find many uses in the school or home workshop. It may be quickly made. It works on the wedge principle and holds the pieces firmly together.



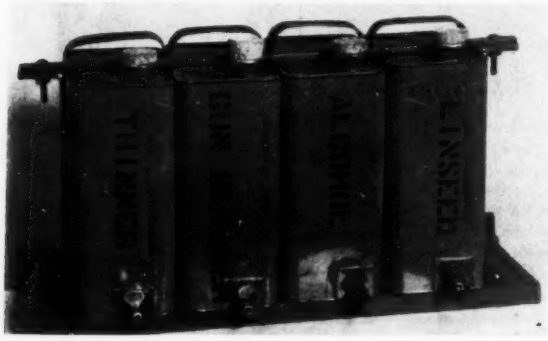
CONSERVING FINISHING MATERIALS

R. B. McHenry, Central High School, Tulsa, Oklahoma

Every woodworking instructor is confronted with the problem of effecting economies in finishing materials. Much of the loss is due to dropping the can while handling it, evaporation, and spilling while pouring from the can.

To avoid dropping the cans, a rack was built, in which four one-gallon cans are firmly clamped together, as shown in the illustration. The base of this rack is made of ¾-in. wood. It is cut to a length that will fit snugly in the finishing-material cabinet. The uprights of the rack are made of strap iron and extend up to the level of the can tops. The crossbar is made of the same weight of strap iron as the uprights, and is bolted to the uprights with a stove bolt at each end. This eliminates frequent handling of the cans.

The racks are placed in the finishing-material cabinet so that the cans may be refilled without removing them from the cabinet. The only time the corks are removed from the cans is during refilling. This reduces the evaporation to a minimum.



Finishing Material Containers

A piece of 3/16-in. brass about 1¼ in. square was sweated on each can near the bottom. The brass was drilled and tapped to hold an oil-drain petcock, taken from a Model T Ford crankcase. These petcocks are used for dispensing the liquids, thus avoiding spilling while pouring. A small hole in the top of each can admits sufficient air to make the liquid flow readily when the petcock is opened.

COMBINATION WOOD AND METAL BENCH

Alden H. Loomis, Department of Occupational Therapy, Menninger's Hospital, Topeka, Kansas

The bench shown in Figures 1 and 2 fits admirably into the home project shop of any boy taking vocational agriculture or into the home workshop of any boy interested in home mechanics.

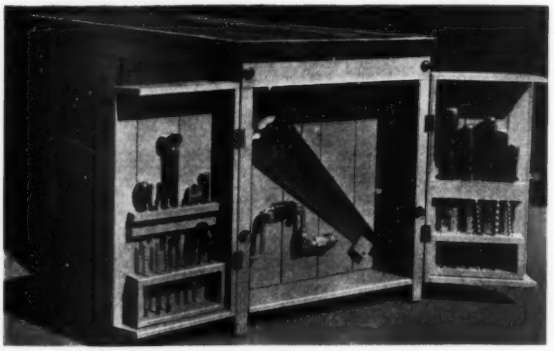


Fig. 2. The home workbench showing the tool cabinet

It is suitable for both wood and metal work. Figure 4 shows how the metal vise may be locked in the wood vise, and Figure 3 shows how the metal vise may be swung either to the right or left on the bolt at the back of the bench, when the vise is not in use.

The built-in tool cabinet on the right end provides a convenient storage space for some of the tools. The workman

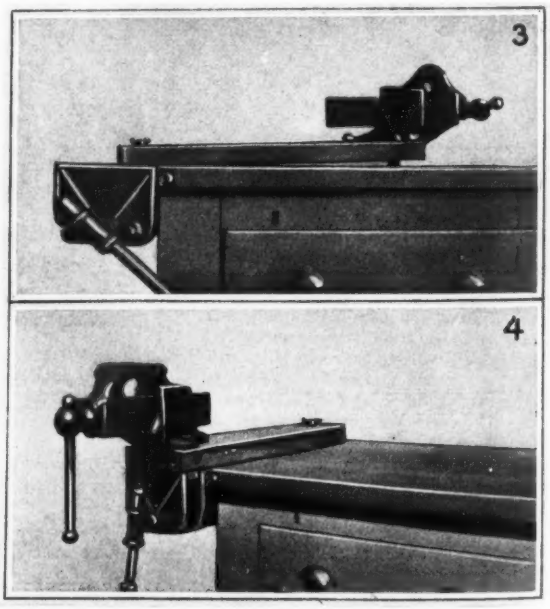


Fig. 3 shows the metal vise swung out of the way. In Fig. 4 the metal vise is securely held in place by the bench vise

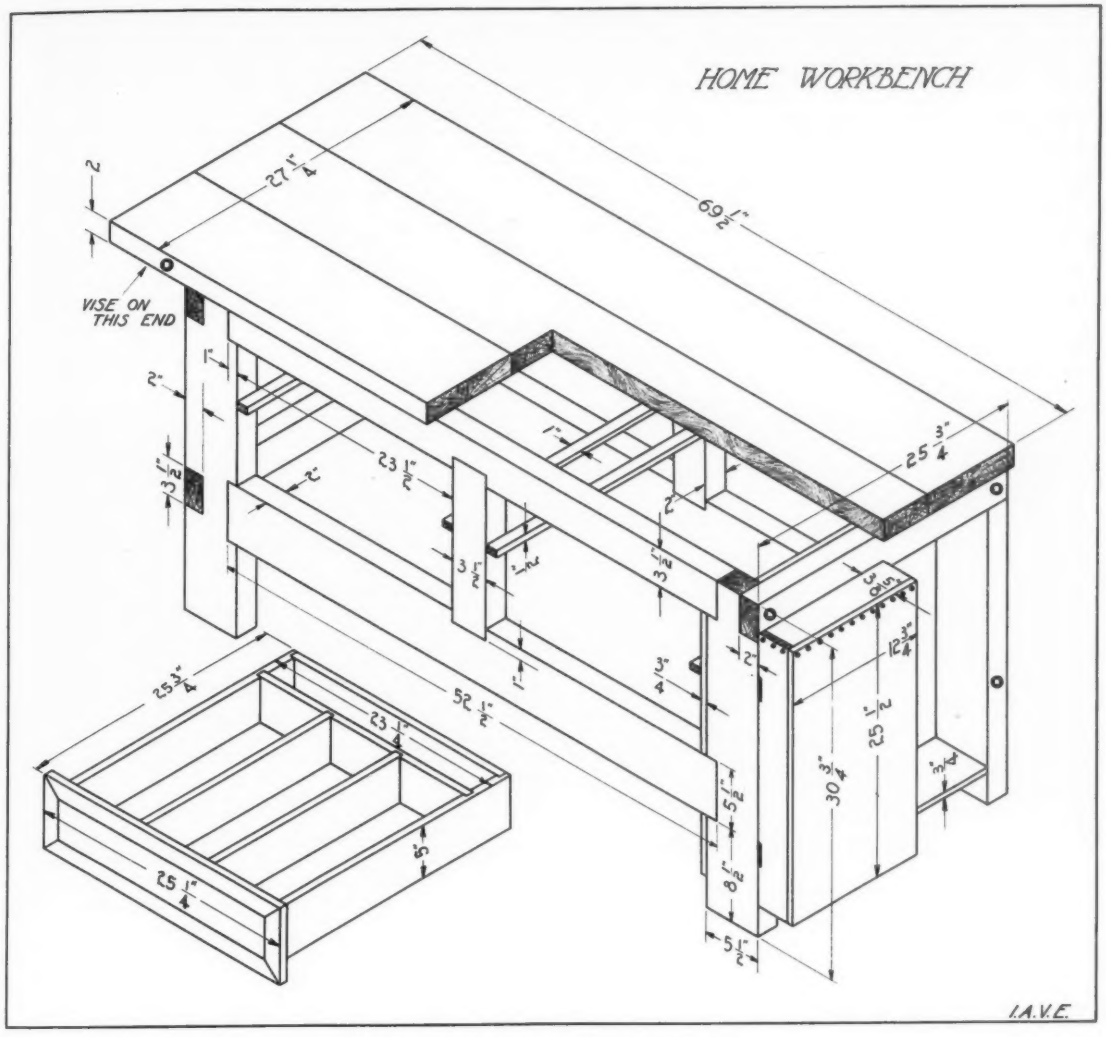


Fig. 1. Details of the home workbench

can reach any part of the cabinet from the front side of the bench.

Ample drawer space is also provided in two large drawers, partitioned in such a way as to take care of pipe wrenches and similar tools. A compartment in the back of one of the drawers is out of sight unless the drawer is completely removed.

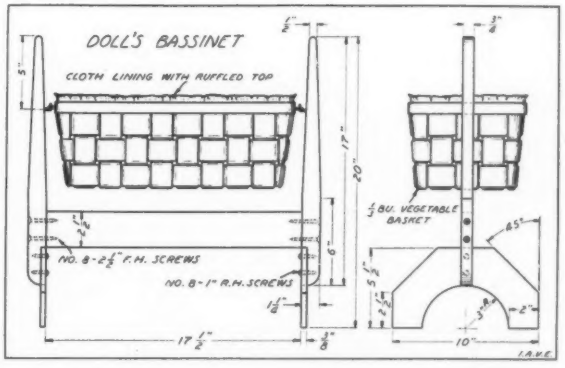
A special feature of the bench is that it can be knocked down, moved and set up with very little effort. There is only one bolt to take out to remove the metal vise. The wood vise is removed with the top, which is held in place by four cleats and its own weight. The drawer guides and supports are released by removing a few screws. The tool cabinet is released intact by removing four bolts. In a similar manner the left end is released which automatically sets free the side rails thus leaving the whole bench knocked down for shipment or storage.

A DOLL'S BASSINET

S. Paul Nutten, Day School for the Deaf, Detroit, Michigan

The doll's bassinet is very acceptable for the elementary shop. It combines several tool processes in one simple, sturdy, interesting project. The sewing which completes the job may be done in the sewing classes, or it may be done by mother or big sister.

Any soft wood may be used. The pieces are all shaped and



sanded before assembly. The feet are screwed to the uprights with No. 8 1-in. r.h. screws and the cross bar is fastened with No. 8 2½-in. f.h. screws.

The basket, which is a one-third bushel vegetable basket from the grocery store, should be inspected for slivers and loose splints and the handle removed. It is hung by means of two small screw eyes screwed through the splints just far enough so that a small bulb of solder may be placed on the end of the screw. These hook on to screw hooks in the uprights 7 in. above the top edge of the cross bar.

A coat of shellac is applied to the outside of the basket and the whole job is finished with a coat of ivory flat paint, a coat of ivory flat and enamel mixed, and a coat of ivory enamel.

THE MORTISE-AND-TENON JOINT—I

John E. Doren, Eureka High School, Eureka, California

With the advent of individual instruction in our modern high schools, and the present trend toward ungraded classes in the industrial and vocational departments, it is necessary that the background of technical information so essential to student progress be supplied in some way which does not place an undue burden upon the teacher. It is the purpose of this article to supply the necessary technical information regarding the mortise-and-tenon joint and its application to present-day practical design and construction.

This type of joint is used very extensively in furniture, cabinet, and millwork, and when clearly understood, may be successfully adapted in one form or another to a wide variety of work.

To avoid confusion in the meanings of the terms *mortise* and *tenon,* it is well to associate these names with other terms that are well known; namely, *mortise* may be associated in meaning with *mouth,* and *tenon* may be associated in meaning with *tongue.*

Definitions:

A *mortise* is a cavity cut into a piece of wood to receive a tenon or tongue.

A *tenon* is a tongue-shaped end of a piece of wood prepared to fit into a mortise.

Types of Tenons

There are only two distinct types of tenons used in present-day practice in connection with the woodworking industries; namely, *through tenons* and *blind tenons.* These two types may vary considerably as will be seen by studying the following classification:

I. The *through tenon,* as the name implies, passes entirely through the mortised member.

The *full-width through tenon* is a tenon of the same width as the material of which it is a part.

The *relished through tenon* is a tenon that is reduced in width to meet special conditions.

The *bareface through tenon* is a tenon with but one shoulder.

The *double through tenon* is applied to very wide rails only.

When the mortises have been properly prepared, any of these tenons may be successfully wedged.

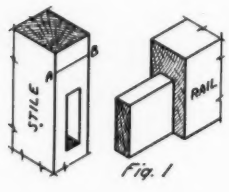


Fig. 1

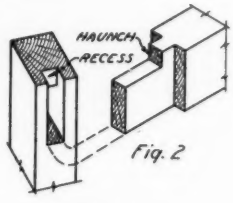


Fig. 2

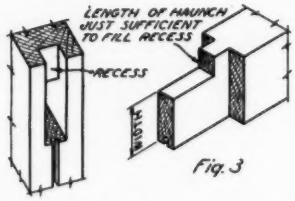


Fig. 3

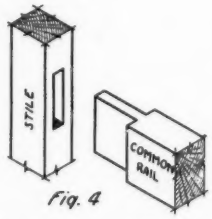


Fig. 4

II. The *blind tenon,* as the name implies, is entirely concealed when the joint is assembled.

The *long blind tenon* is a tenon from four to six times longer than it is thick.

The *relished blind tenon* is a tenon which is reduced in width at one edge only, with plain butt shoulder (see Fig. 1).

The *relished and haunched blind tenon* (see Fig. 2).

The *relished and recessed blind tenon* (see Fig. 3).

The *full-width blind tenon* (see Figs. 4 and 5).

The *bareface blind tenon.* A tenon with but one main shoulder (see Fig. 6). Tenons of this type may be either full width or relished.

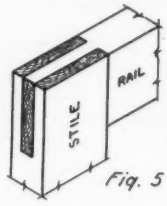


Fig. 5

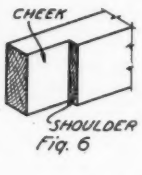


Fig. 6

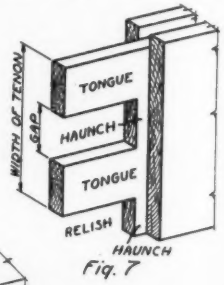


Fig. 7

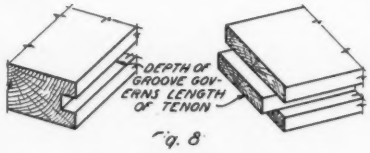


Fig. 8

The *multiple blind tenon.* A tenon over 4 in. wide is often made in two or more sections (see Fig. 7).

Any of the tenons in this group may be secured with blind wedges.

The *stub tenon* is a very short tenon (see Fig. 8). It may be relished for special work, or it may be full width.

(To be continued)

Associations, Conventions

THE 1933 A.V.A. CONVENTION

With time all too short to attend the numerous sessions, meet all the friends, and visit all the places of interest offered by Detroit, the convention city, at which the American Vocational Association met December 6 to 9, 1933, the eighth annual convention of that organization came to a close.

The attendance was very good considering present conditions. The industrial-arts sections were all well attended. The Thursday afternoon session, presided over by Prof. Arthur B. Mays, University of Illinois, at which the Committee on Standards of Attainment in Industrial-Arts Teaching and the Tests and Measurements in Industrial Arts reported, was especially interesting because of the active interest shown by all of those in attendance.

The meeting on Friday afternoon, in which the "Requirements and Training of Industrial-Arts Teachers" was discussed, was presided over by Roy G. Fales, state supervisor of industrial arts, Albany, N. Y. At this meeting Elmer W. Christy, Cincinnati, Ohio, spoke on "The Desirable Personal Characteristics and Traits of the Industrial-Arts Instructor." George F. Weber, South Bend, Ind., discussed "The Desirable Technical and Professional Training." Verne C. Fryklund, University of Minnesota, showed what teacher-training institutions can do in the selection of teachers and how they can train candidates for teachers' positions in desirable personal characteristics and traits. Clyde A. Bowman of The Stout Institute, Menomonie, Wis., spoke on what teacher-training institutions can do in the way of professional and technical training.

A very interesting feature of this year's convention was the Epsilon Pi Tau banquet held on Friday at 6 p.m. The toastmaster at this banquet was Frank C. Moore, Cleveland, Ohio. Dr. Homer J. Smith of the University of Minnesota, gave the opening talk on the general topic "Public and Professional Relationships." His address was entitled "Having a Point of View." He was followed by John E. Fintz, Cleveland, Ohio, with an address on "What the Individual Teacher Can Do." burton A. Nelson, of The Stout Institute, spoke on "The Relations with Educational Leaders," and Prof. George E. Myers, University of Michigan, spoke on "Where Are We Bound?" "The Opportunity and Responsibility of Epsilon Pi Tau" was discussed by Dr. William E. Warner, Ohio State University. Thereupon the 1934 review of Epsilon Pi Tau was presented by five-minute speeches by some of the contributors to this review.

The Saturday morning meeting was presided over by Earl L. Bedell, Detroit. It was in the form of a panel discussion, the members of the panel being Messrs. Bauder, Lamb, Cushman, Novak, Keyworth, Ferns, Smith, Warner, Easton, Christy, and Winegar.

The industrial-arts luncheon, held Saturday at 12:30 p.m., was well attended. Malcolm Bingay, managing editor of the Detroit *Free Press,* was the toastmaster. John H. Trybom, director of vocational education, Detroit, spoke on "Suggested Ideal Shopwork Program." E. L. Bowman, registrar, Butler University, discussed the "Possibilities of Supplementary Work in Shop Courses and Its Relation to College-Entrance Requirements." Frank Cushman spoke on the "Possibilities of Federal Aid to Vocational Education in High Schools." Prof. Arthur B. Mays, discussed the "Cultural Value of Shopwork in the High School." J. A. G. Easton, Toronto, discussed the

shopwork in the Canadian high schools, and Charles Winegar, director of personnel, The Chrysler Corporation, showed what the taxpayer expects from shopwork in high schools.

Besides these industrial-arts meetings, part-time and full-time vocational-education groups, and those interested in rehabilitation and vocational guidance held their full quota of sessions. At these meetings such questions as the following were discussed: Should NRA codes be amended to recognize apprenticeship?; should part-time industrial education be redefined?; report on unit costs in vocational education; trends in senior-high-school enrollment; should city programs of industrial education recognize technological advance in industry?; how city directors are concerned with "made-work" programs for unemployed teachers; what is the city director's relation to the problem of training adults for effective use of leisure time?; how may city directors coöperate with state rehabilitation officials?; how to select persons to be trained as vocational instructors; the upgrading of teachers in service; giving attention to the needs of individual students; the certification of vocational teachers; the changing status of the part-time school in Pennsylvania and in Michigan; the new continuation-school student; flexible programs; individual instruction; the organization of the county to take care of vocational guidance; an experiment in guidance and placement with out-of-school and out-of-work young men; and the United States Government and vocational guidance.

The second sectional meeting was conducted by Mr. Roy G. Fales, state supervisor of industrial arts, who was responsible for the excellent program.

A talk on "Improvement of Teaching Through Local Clubs" was presented by Mr. E. W. Manzer, Bronxville, N. Y. A résumé of the work done by the Westchester County Industrial-Arts Club was presented and plans for the club were explained.

Mr. Warren W. Coxe, of Albany, gave a talk on "Research in the Industrial Arts," in which he pointed the need for research in industrial arts, the relating of the work to actual living conditions, the conducting of shops as laboratories, and the correlation of industrial arts with other subjects.

In his "Challenge to Industrial Arts," Dean Harry S. Ganders, of Syracuse University, pleaded for the integration of subjects through the project method and urged that the cultural aspect of the industrial arts be brought to the surface. — *E. W. Manzer.*

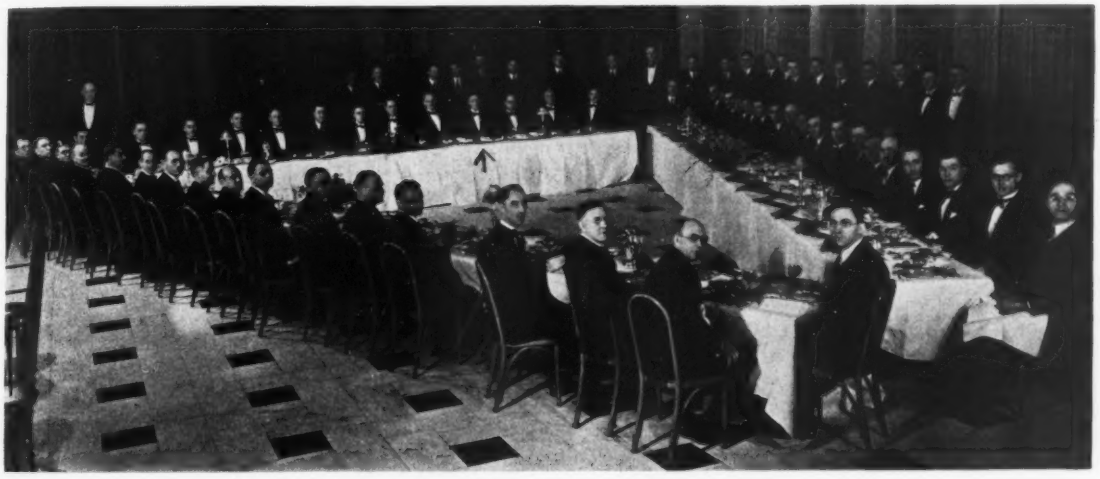
CENTRAL CONNECTICUT INDUSTRIAL-ARTS ASSOCIATION MEETS

The fall meeting of the Central Connecticut Industrial-Arts Association was held at the Jennings School, Bristol, Conn.

Following the dinner, the chairman introduced Mr. K. A. Reiche, superintendent of schools, who welcomed the association to Bristol. Mr. Thomas H. Paterson, who followed, traced the growth of the manual-training movement during his service of 43 years as an educator. Mr. Harold French, principal of the Jennings School, spoke of the value of manual training in his school. Mr. Charles Riley, president of the Horton Manufacturing Company, described some of the interesting parts of the world that he had visited in his travels.

At the business meeting, presided over by President McAndrews, the following officers were elected for the coming year: President, Walter McAndrews, Hartford; and Dennis O'Connor, Waterbury; John Conray, Meriden; Tom Pascoe, West Hartford; Paul Clarke, New Britain.

It was decided to hold the annual meeting at New Haven, on January 17. — *Harry A. Barnicle.*



Annual Banquet of Epsilon Pi Tau at the A.V.A. Convention, Dec. 8, 1933

The Ship had its usually well-attended program at which good feeling, good cheer, and hilarity was generally evident.

At the house of delegates meeting, the following new officers of the A.V.A. were elected: President, Ray Fife, Columbus, Ohio; vice-president, A. K. Getman, Albany, N. Y.; treasurer, Charles W. Sylvester, Baltimore, Md. The vice-presidents retained in office are Jacob Spies, Sheboygan, Wis.; Elizabeth Amery, Baltimore, Md.; R. W. Selvidge, Columbia, Mo.; T. H. Quigley, Atlanta, Ga.; O. M. Sullivan, St. Paul, Minn.; and P. W. Chapman, Athens, Ga.

Other prominent speakers who addressed the eighth annual convention of the American Vocational Association were: Dr. Geo. F. Zook, United States Commissioner of Education; C. A. Prosser, Director of Dunwoody Industrial Institute, Minneapolis, Minn.; C. R. Arnold, Agricultural Adjustment Administration, Washington, D. C.; Chester Gray, American Farm Bureau Association, Washington, D. C.; Mrs. B. F. Langworthy, first vice-president National Congress of Parents and Teachers, Winnetka, Ill.; Franklin J. Keller, Director of National Occupational Conference, New York City; and Anna L. Burdick, Federal Board for Vocational Education, Washington, D. C.

NEW YORK VOCATIONAL ASSOCIATION MEETS AT SYRACUSE

The fourth annual meeting of the New York State Vocational Association was held December 28 and 29, at Syracuse.

The industrial-arts sectional meetings were well attended and a profitable program was presented at each meeting. Mr. Sam T. Cramblet, of Port Washington, was chairman of the first meeting, at which the topic "Organization in Industrial-Arts Shops" was discussed.

In his subject "The Teacher and His Plans," Mr. Philip A. Cowen, director of the research division for the state education department, advised shop instructors to analyze their work and select pertinent objectives that will aid in general education as well as industrial-arts education.

An interesting group discussion was conducted by Mr. Gordon O. Wilber, of the State Teachers' College, Oswego, with Mr. Fuller, Mr. Wycoff, and Mr. Brocken assisting. It was voted that all record forms be sent to Mr. Wilber, so that he may make an analysis of the forms and make a report.

A talk on "The Use of the Library and Planning Center" by Mr. Albert H. Hubbard, of Oswego, and Mr. C. D. Martin, of Hicksville, brought out a number of good suggestions. Mr. Hubbard showed how the finishing room may be transformed into a workable library, and Mr. Martin gave suggestions for the organization of filing cards for related material.

Valuable demonstrations were given by Mr. H. H. North, of Syracuse, on "Molding Methods"; by Mr. William J. Becker, Ithaca, on "Art Metal Decoration and Finishing"; and by Mr. Richard B. Johnson, Islip, on "Flying and Making Model Airplanes."

SCHOOL CRAFTS CLUB OF NEW YORK AND NEW JERSEY MEETS

The School Crafts Club of New York and New Jersey held its regular meeting on Saturday, November 18, in New York City.

At this meeting, Mr. Thomas Darling, of New York City, an experienced boat builder and designer, spoke authoritatively on boat design and its importance, materials used, and methods of building and assembling boat models. Mr. Russell F. Trimble gave a very interesting and instructive demonstration with liquid air.

The following officers were elected for the next year: President, C. Dudley Moore, Glen Ridge, N. J.; vice-president, Harry Fletcher, Elmhurst, N. J.; secretary, Norman A. Crow, Fairlawn, N. J.; treasurer, Arnold Hess, Sea Bright, N. J.; financial secretary, Lawrence J. Heming, Jackson Heights, N. Y. — *Loring J. Barker.*

MEETINGS OF THE MASSACHUSETTS INDUSTRIAL-EDUCATION SOCIETY

The regular November meeting of the Massachusetts Industrial-Education Society was held on Saturday, November 18, at the Hotel Westminster, Boston. The speaker of the evening, Mr. Robert J. Watt, secretary-treasurer, talked on the subject "Labor and Education." Mr. Watt declared that the NRA has taken 20,000 children out of industry, and has prohibited them from employment. The school must definitely plan to take care of them. He pointed out that America lacks social intelligence, and as an illustration, cited the cases of over 800 being present in the Massachusetts State House at a debate on liquor, while at the same time, 14 bills were being presented to the Children's Commission with only two people present. Mr. Watt said that much as he opposed the thought of federal control in education, the country would be much better off under such a system.

At the December meeting, held on Saturday, December 16, Mr. A. H. Morrison, of the Mechanic Arts High School, Boston, spoke on "Modern

Trends in Mechanic Arts." He traced the mechanic-arts movement from its beginning to the present time. He voiced the opinion that the next few years will show a growth in mechanic arts and trade work, and a reduction in enrollment in the strictly classical high school.

At the January meeting, held on Saturday, January 6, Rev. Jones I. Corrigan, S.J., professor of sociology at Boston College, was the speaker. He was eloquent in his praise of President Roosevelt and his administration and hailed the NRA as the greatest single public document since the Magna Charta of 1215. The new deal, he said, is a fair deal, which means a fair profit for capital, fair hours, a living wage, and a fair price for the consumer. The present period of chastened capital under codes, he pointed out, will be followed by coördinated and ordered capital, under a profit system. — *Louis A. Van Ham.*

TEXAS VOCATIONAL TEACHERS' ASSOCIATION MEETS

The Texas Vocational Teachers' Association held its regular meeting December 1 and 2, at Austin. Mr. C. G. Dodson, Dallas, opened the meeting on the first day. Talks were given by Earl L. Bedell, Detroit; J. O. Loftin, San Antonio; C. A. Johnson, Houston; Ben Schwegman, San Antonio; C. B. Gatchell, Mt. Pleasant; Dr. W. J. McConnell, Denton; Dr. C. E. Rowe, Austin; and V. J. Smith, Alpine. There was a round-table discussion led by Mr. Bedell, assisted by G. H. Fern and E. L. Williams.

Mr. E. L. Williams, of College Station, was chairman of the second day's meeting. Following the report of the state directors of vocational education, Mr. R. H. Montgomery, University of Texas, gave a talk on "Vocational Education."

At the business meeting, the following officers were elected: President, S. C. Wilson, Huntsville; first vice-president, Albert McLeland, Fort Worth; second vice-president, C. A. Johnson, Houston; third vice-president, A. H. Abbott; secretary-treasurer, Mrs. Ida Hudnal, Austin. Mr. A. T. Kreuger was elected chairman of the industrial-education section, Mr. C. C. Davis of the industrial-arts section, and Mr. Albert McLeland was made permanent secretary. — *V. J. Smith.*

MEETING OF THE WESTERN ILLINOIS INDUSTRIAL-ARTS AND VOCATIONAL ROUND TABLE

The monthly meeting of the Western Illinois Industrial-Arts and Vocational Round Table was held December 6, at Kewanee, with Mr. Paul U. McMorris, of Kewanee, acting as chairman.

Mr. Galen L. Landis, of Kewanee, described the general-shop program as carried on in the Kewanee junior high schools.

Mr. McMorris presented the subject, "Testing in Industrial Arts," and exhibited the teaching aids, such as standard tests, and operation and job sheets.

A group of instructors have been appointed, with Mr. Morgan Johnson as chairman, for research work in the industrial-arts field.

The next meeting, on February 7, will be held at Galesburg, with Mr. Thomas U. Brooking as chairman. — *Galen L. Landis.*

MEETING OF THE PEORIA INDUSTRIAL-EDUCATION CLUB

The monthly meeting of the Peoria Industrial-Education Club was held on Tuesday, December 19, at the Westminster Church. About thirty members were present, and the guests of the evening were the principals of the three Peoria high schools, Mr. J. H. Brewer, Mr. C. B. Baymiller, and Mr. W. G. Russell.

The topic of the meeting was "The Sixty-Minute Period in the Industrial-Arts Subjects and Its Effect on University Credits." The speaker was Prof. R. P. Hoelscher, a member of the faculty at the University of Illinois, who discussed the results of a study of accredited high schools outside of Chicago. He maintained that the industrial-arts course demands more in the way of informational material and outside preparation on the part of the pupil. The majority of schools have an eight-period day and a 180-day school year.

Following the address, a question period was conducted by Mr. R. Bates, of Elmwood.

At the meeting on January 8, at the Enders Hotel, Mr. R. V. Lindsey, principal of the Pekin Community High School, spoke on "The Sixty-Minute Period in the High School from the Administrative Standpoint." Mr. Lindsey contended that there are two methods for the industrial-arts subjects under the new method of dividing the day — one the laboratory method of three days of one-period recitation, and two days of double-period shop practice. Where this method has been tried out, some difficulty was encountered in getting sufficient material for the three recitations per week, due to inadequate library facilities, and the lack of proper administration.

The second method, which is more commonly used, is a sixty-minute period and a six-hour day. Mr. Lindsey pointed out that the radio and the movies prevented sufficient home study. With the sixty-minute class period in industrial arts, twenty per cent of the time would be given to class study and should come at the time when the problem arises. He suggested a plan where the student takes only two subjects for nine weeks and then two other subjects for nine weeks. Under this plan, the student would spend half of the day with one teacher and the remainder of the day with another.

Mr. Ben Moffet, of the Caterpillar Training School, spoke on "Impressions of the A.V.A. Meeting at Detroit." The next meeting will be held in connection with the Northwestern Illinois Round Table at Galesburg, in February. — *F. L. Barloga.*

News Notes

Summer Courses at University of Minnesota

The industrial arts will have a prominent place in the curriculum of the 1934 summer session at the University of Minnesota, from June 20 to July 28 and from July 28 to September 1.

A series of courses in wood and metal working, furniture making, and fine arts will be offered in the college of engineering and architecture. The school of chemistry is offering a number of industrial courses, particularly two in chemical manufacture. Art education will stress the creative enjoyment of leisure time, and its courses will be combined in such a way that art teachers and social workers will be equipped to show the recreational uses of art in clubs, adult groups, and extracurricular activities. Agricultural education will consider a multitude of problems confronting agriculture and teachers of agriculture.

Vocational teachers will be offered a variety of courses, including political science, journalism, sociology, and business.

Summer Courses in the State of Oregon

Operating the second year under the unified system, the Oregon summer sessions will be held again at the six centers: University of Oregon in Portland and Eugene; Oregon State College at Corvallis; Oregon Normal School at Monmouth; Southern Oregon Normal School at Ashland; and Eastern Oregon Normal School at La Grande. Second sessions will be held at Eugene and Monmouth.

Summer Courses at The Stout Institute

Industrial-arts and vocational-education teachers will find many things to interest them in the 1934 summer session at The Stout Institute, Menomonie, Wis. The summer session will last six weeks, June 18 to July 27.

This session affords the teacher in service an opportunity to keep pace with the requirements of the times. Basic courses in industrial-arts and vocational education, English, science, social science, and athletic coaching also are offered.

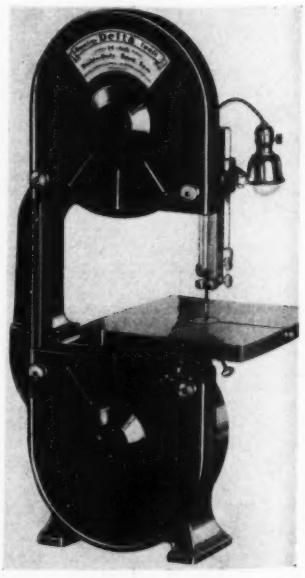
Summer Courses at Bradley Polytechnic Institute

The 1934 summer session at Bradley Polytechnic Institute, Peoria, Illinois, will consist of two terms: June 11 to July 20, and July 23 to August 25. The offerings this year consist of courses in industrial arts, home economics, education, and general college work.

SchoolShopEquipmentNews

NEW DELTA BAND SAW

The Delta Manufacturing Company, Milwaukee, Wis., announces a new 14-in. band saw containing a number of interesting features.



The band saw has a normal capacity adapted to 6-in. stock, but this may be increased to 12¼-in. stock by the use of an ingenious height attachment. The machine is useful for cutting balsa blocks, and for resawing material much wider than is possible with the ordinary 14-in. band saw. The wheels are of the disk type, with cementless rims. They run on self-sealed "new departure" ball bearings, which prevent the escape of lubricant and exclude dirt, insuring trouble-free service for the life of the bearing.

A unique feature permits adjustment of the blade support independently of the adjustment of the guide pin. Each one of these adjustments is fitted with a micrometer screw, which permits fine adjustments with a minimum of trouble and a maximum of accuracy. Blade supports above and below the table are self-sealed precision ball bearings of the reversible type.

(Continued on page 6a)

Good Books Help Instructors Handle Larger Classes More Successfully

Present Trend in Education. More emphasis is now being put on the learner. To satisfy this trend for shop courses, adequate provision should be made for students to read and effectively "digest" printed technical material.

Time Saver for Teachers. Any instructor who uses good books as part of the classroom "teaching-tool" equipment will save much of his time which becomes more valuable as the size of the class increases.

Better Training for Pupil. The pupil will probably get better training partly because the instructor should then have more time to give to other teaching details. Further gain will come to the student after he leaves school and enters the world of work because he is better prepared to learn from the printed page which is so important for his vocational success.

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The machine is mounted on a heavy, well-ribbed, cast-iron table, which swings on heavy trunnions, forming a smoothly operating but rigid machine. The saw is completely guarded. A lamp attachment makes the machine independent of the shop lighting and adds to its portability.

Complete information may be obtained by any school-shop instructor upon request.

NEW ARMSTRONG STAR DRILLS

Armstrong Bros. Tool Company, 317 N. Francisco Ave., Chicago, Ill., has issued a circular, describing and illustrating its new Star drills, for hand drilling in concrete, stone, brick, plaster, tile, and asphalt.

The Armstrong drills are drop-forged from special high-carbon chisel steel. They have toughness and stamina; make the hole faster, cleaner, and easier; and hold their sharpness longer than other drills. In addition they give long and satisfying service.

Drills from ¼ to 1 in., varying by sixteenths, may be had in 8-, 12-, 18-, and 24-in. lengths. Those from 1 to 1½ vary by eighths, and are obtainable in 12-, 18-, and 24-in. lengths.

CRAFTSMAN WOOD SERVICE CATALOG

The Craftsman Wood Service Company, 2727 Mary Street, Chicago, Ill., has issued a new Catalog F, useful to the teacher in the school shop, to the owner of the small repair shop, and to the amateur in the home workshop. In it are described and illustrated the firm's complete line of imported and domestic rare woods and veneers, craftsman's books, furniture designs, tools, supplies, and cabinet hardware.

The firm buys rare woods from all over the world and is equipped to sell in any quantities needed, at reasonable prices, whether one square foot or a carload is ordered. A copy of the catalog will be sent to any shop instructor upon request.

NEW CATALOG FOR THE METAL-WORKING SHOP

The Wrot Iron Designers, 541 West 35th Street, New York City, have issued a new 55-page large-sized catalog describing and illustrating their hard-to-get materials. This catalog will be welcomed by every instructor of metal working in the school shop.

In it are illustrated and described the various types of bars, angle irons, plain and pierced metal sheets, plain and ornamental pipe and tubing, fancy trimming bars, moldings and crestings, finials and terminals, pressed and forged ornaments, rosettes, husks, leaves, candle pans, embossed ornaments, ornamental nails and rivets, hinges, catches, locks, pulls, wire mesh, and electric-lamp fittings. Metal-working tools, work sheets, kits for artistic metal projects, and books for the metal worker also are listed and described.

This firm also has just issued Volume G of its "Art in Iron" series. This volume contains twenty 8½ by 11-in. pages of designs for artistic fireplace equipment. Among these designs are eighteen fire screens, numerous period andirons, together with such fireplace accessories as pokers, shovels, brooms, broilers, toasters, spits, spiders, cranes, wood basket, etc.

The six preceding volumes of "Art in Iron" were devoted to doors and gates, interior railings, exterior railings, grilles, lamps and candlesticks, and lanterns and fixtures. These volumes sell at a modest price.

ISSUE NEW STANLEY ROUTER INSTRUCTION BOOK

The Stanley Electric Tool Company, of New Britain, Conn., has just issued a Router and Shaper Instruction Book. This extremely useful booklet offers instructions on the care and use of these tools. Following the plain directions given will insure long and successful performance. The booklet contains 62 pages of photographs and descriptive matter on bits and cutters, open and blind dovetailing, mortising, tenoning, and template work, jointing, fancy molding, template routing, inlaying, and straight-border inlaying. The last part of the booklet is devoted to a parts list and illustrations of common wood cuts and wood joints.